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4-8-2014

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# Ending “Too Big To Fail”: Government Promises Versus Investor Perceptions\*

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**Abstract.** Can a government credibly promise not to bailout firms whose failure would have major negative systemic consequences? Our analysis of Korea’s 1997–98 crisis suggests an answer: No. Despite a general “no bailout” policy during the crisis, the largest Korean corporate groups—facing severe financial and governance problems—could still borrow heavily from households by issuing bonds at prices implying very low expected default risk. The evidence suggests “too big to fail” beliefs were not eliminated by government promises because investors believed that this policy was not time consistent. Subsequent bailouts confirmed the market view that creditors would be protected.

*JEL Classification:* E44, G18, K00, N20, P16, P17

The global financial crisis of 2008–09 and its aftermath have highlighted the problems that occur when corporate entities are “too big to fail” (TBTF).<sup>1</sup> The potential bankruptcy of some large firms, in the USA and more broadly, was seen by numerous governments as likely to damage their economy; consequently, many countries put in place extraordinary measures to protect their largest financial *and* non-financial firms, including banks, insurance companies, and auto manufacturers (Sorkin, 2009). Presumably,

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\* For generous financial support, Johnson thanks the Institute for New Economic Thinking and Rhee thanks the Center for International Trade and Finance at Seoul National University. We are also grateful to Bruno Biais, Olivier Blanchard, Hülya Eraslan, Mike Faulkender, Radha Gopalan, Marco Pagano, Ernst-Ludwig von Thadden, Vikrant Vig, and participants at the CEPR European Summer Symposium in Financial Markets, the Olin Business School—Washington University in St. Louis Finance luncheon, M.I.T. Development & Finance lunches, and the World Bank Finance Research Group Seminar for their many useful comments. All remaining errors and omissions are our own.  
<sup>1</sup> “Too big to fail” (TBTF) is far from a new issue, as discussed in detail by Stern and Feldman (2004)—in the modern American context, it dates from at least the conservatorship of Continental Illinois in the 1980s. Concerns about this issue have become more intense since fall 2008.

these efforts undermine incentives for careful risk management in the future—managers are less likely to be careful if they feel that downside risks (both personal and corporate) will be covered by the state, and outside investors will provide cheaper capital to such implicitly state-guaranteed firms.

In an attempt to mitigate TBTF beliefs among managers and investors, governments now promise not to provide further bailouts. For example, Title II of the Dodd–Frank financial legislation (signed into law on July 21, 2010) creates a “resolution authority” that allows a regulatory agency (the Federal Deposit Insurance Corporation) to manage the effective bankruptcy of big non-bank financial institutions, that is, run an orderly process in which creditors and shareholders incur losses (and management can be fired) but—in principle—the financial system is not jeopardized and there is no shock to the broader economy. If investors view this as credible, they should no longer provide cheap funding for TBTF financial institutions.<sup>2</sup>

Can such a “no bailout” government policy constitute a credible commitment that solves the problem of “too big to fail”? In the view of Alessandri and Haldane (2009, p. 7)—from the Bank of England—such promises are unlikely to be believed:

“Ex-ante, they [the authorities] may well say “never again”. But the ex-post costs of crisis mean that such a statement lacks credibility. Knowing this, the rational response by market participants is to double their bets.”

Ex-ante promises to let companies fail—and run through some form of bankruptcy—may not be optimal when the moment for a decision actually arrives. In particular, given the “systemic” nature of financial crises—with widespread perceived contagion both within and across countries—will financial markets really believe any government when it promises not to save its biggest financial and non-financial firms?

Relevant experience in South Korea suggests an answer: No. When financial crisis broke out at the end of 1997 and the exchange rate depreciated rapidly, Korean government policy was explicitly not to bailout the largest Korean business groups (known as chaebol). This commitment to not bailout the firms was more credible than the standard promises governments provide in this regard. The commitment was rooted in the incoming

<sup>2</sup> This was the claim made by President Obama when he signed the Dodd–Frank bill into law in July 2010, “Finally, because of this law, the American people will never again be asked to foot the bill for Wall Street’s mistakes. There will be no more taxpayer-funded bailouts. Period. If a large financial institution should ever fail, this reform gives us the ability to wind it down without endangering the broader economy. There will be new rules to make clear that no firm is somehow protected because it is “too big to fail,” so that we do not have another AIG.” (<http://www.marketwatch.com/story/text-of-obama-remarks-on-dodd-frank-2010-07-21>).

president's long-standing opposition to the political power of large chaebol and was further bolstered by the IMF and US Treasury's insistence that such a commitment be formally stated in the country's Letters of Intent with the IMF in December 1997 as a condition of financial assistance.

Despite this, anecdotal evidence suggests investors still perceived these firms as TBTF, and these perceptions proved largely correct. The largest business groups ("chaebol") were able to borrow heavily by issuing bonds at low interest rates in 1998—allowing many of them to avoid immediate failure and become even bigger relative to the economy. Eventually, Daewoo, Korea's third largest business group, declared bankruptcy in 1999, and Hyundai, Korea's largest business group, also had a *de facto* default in 2000. In both cases, the Korea government, fearing another economic crisis, intervened so as to effectively and largely bail out the bond investors.

To assess the extent to which TBTF beliefs contributed to the flow of bond finance toward chaebol-affiliated firms in 1998, we obtained comprehensive data on the amount and date of issuance for every publicly placed corporate bond in Korea in 1998. The dataset, which covers 1,175 bond issues, also includes the yield-to-maturity (YTM) for each bond issue at the time of issuance along with the issuing firm's credit rating at the time. Using company names, we then matched the issuance-level data to firms' financial and ownership data, as compiled by National Information Credit Evaluation (NICE). Finally, we match this data to firms' chaebol affiliation using data provided by the Korean Fair Trade Commission (KFTC).

Using these data, we confirm that the chaebol-affiliated firms, particularly Korea's biggest chaebols, did in fact enjoy disproportionate access to bond financing in 1998. Within our panel of firms, firms in the largest five chaebols accounted for 53% of net bond flows in 1998, while firms in the next twenty-five largest chaebols accounted for 11%. Our empirical analysis also confirms that chaebol-affiliated firms' use of bond financing in 1998 was significantly more than that of other firms, even after controlling for firm size.

However, it is harder to establish that TBTF beliefs facilitated the largest chaebols' access to bonds in 1998. For example, were investors willing to lend to these large chaebols because they were better run or had better projects at the time, or was it just that investors saw them as TBTF? This is a tough question because post-crisis performance was likely affected by whether or not a firm could obtain external funding. Moreover, pre-crisis performance measures are not necessarily informative as a crisis likely changed the relative profitability of activities.

To control for potential differences in investment opportunities among firms, we employ two complementary approaches. First, we test for differences in post-crisis access to bond financing *within* industries. Using industry fixed effects to control for unobserved differences in investment opportunities across industries, we test whether a chaebol-affiliated firm enjoyed better access to capital relative to other firms in the same industry. Second, we exploit an established feature of emerging markets in general and Korea in particular—specifically the finding that corporate governance matters for firm-level outcomes. The literature has established that firms with weaker corporate governance had less good performance in Korea before the crisis (Joh, 2003), as well as more adverse stock price outcomes during the crisis (Baek, Kang, and Park, 2004). A firm's pre-crisis governance thus provides a plausible alternative proxy for a firm's likely performance and default risk following the crisis.

Using this strategy, we find evidence consistent with investors believing the largest Korean firms were TBTF in 1998. Chaebol-affiliated firms were able to issue significantly more bonds and at better rates relative to other firms that issued bonds in the same industry. These findings are robust to controlling for numerous firm-level characteristics measured prior to the crisis and to controlling for heterogeneity in the type and maturity of bonds issued in 1998. While there is evidence to indicate that bond prices in 1998 incorporated the default risk of firms; this was only true for non-chaebol firms. Non-chaebol firms that eventually went bankrupt paid a significantly higher YTM at time of issuance relative to other firms, while chaebol-affiliated firms that eventually went bankrupt actually paid a *lower* YTM at time of issuance. Moreover, the chaebol-affiliated firms receiving the most bond financing in 1998 (and at the best rates) actually had the worst corporate governance.

Alternative explanations cannot easily explain why chaebol-affiliated firms' were able to issue significantly more bonds and at better rates after the crisis. The greater ability to borrow does not appear driven by implicit cross-debt guarantees among firms within a chaebol. Such guarantees were legally prohibited, and our findings regarding the flow of bonds hold when we aggregate chaebol-affiliated firms up to the group level and treat an entire chaebol as just one observation. Moreover, the lower YTM of chaebol-affiliated firms does not appear to be driven by their potential access to the large, diversified internal capital market of the entire group; our findings regarding the lower YTM of chaebol-affiliated firms are robust to controlling for the size and volatility of the entire chaebol's cash flows and other group-level controls. Less exposure to the Korean crisis because of international business or better export opportunities also does not appear to

explain our findings. There is also no evidence that, absent a government bailout, chaebol-affiliated firms were a lower default risk after the crisis; we find that the default rate of chaebol-affiliated firms was actually higher than that of non-chaebol firms.

Overall, this evidence is consistent with investors believing the very largest Korean chaebol were TBTF in 1998—despite explicit attempts by the government to establish a “no bailout” policy. Because the entire set of firms in a chaebol group were sufficiently important to key components of the economy, it made sense for investors to expect that the government would, one way or another, eventually ride to their rescue. It is very hard to commit not to save massive firms and their investors—because of the “systemic” implications—and investors know this.<sup>3</sup> The Korean evidence suggests that a government commitment—no matter how binding—to not bail out large firms is unlikely to eliminate TBTF beliefs because it is not time consistent.

Our findings complement the existing literature on TBTF, which is relatively small and focused on the US financial sector. Analyzing bond spreads of US banks, Flannery and Sorescu (1996) find evidence that bond prices reflected government guarantees following the bailout of Continental Illinois Bank in 1984, but that the value of this guarantee declined with time. Morgan and Stiroh (2005), however, find evidence that TBTF beliefs persisted through the 1990s for the largest US banks, and Penas and Unal (2004) find evidence that bond returns and credit spreads of US banks around mergers continue to reflect TBTF beliefs by investors. Our article expands the set of retrospective experiences when TBTF was a relevant consideration to non-financial firms, which can also pose a systemic risk when they account for a significant share of the domestic economy. Failure of large, non-financial firms can have wide effects on the domestic economy both directly and indirectly when their failures impose significant losses on major investors, such as banks, pension funds, insurance companies, and money market funds. Our analysis also differs from the previous literature in that we analyze whether TBTF beliefs will persist after the government has made strong commitments to not engage in future bailouts.

Our evidence also fits well with the idea that vested interests play an important role in financial development (Morck, Wolfenzon, and Yeung, 2005) and suggests links between TBTF beliefs and financing arrangements in emerging markets. Minetti and Yun (2013) find evidence that banks did

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<sup>3</sup> This idea is similar to that of Bhattacharya (2003), which derives a model where agents rationally participate in gigantic Ponzi schemes because they correctly believe that a partial bailout is possible when the scheme eventually collapses.

not monitor chaebol carefully before the financial crisis of 1997 and that cross-debt guarantees within chaebol became less important after the crisis. They also find that banks tried harder to monitor chaebol after the crisis (e.g., in loan syndicates)—a point that does not contradict our finding that the largest chaebol were still seen by the broader investing public as “too big to fail.” Our evidence suggests that TBTF beliefs are difficult to eliminate entirely for the largest and most powerful firms in an economy.

The remainder of the article proceeds as follows. Section 1 explains the nature of South Korea’s financial system through the mid-1990s. Section 2 explains our empirical specification, and Section 3 describes the data. Section 4 reports our regressions, and Section 5 concludes.

## 1. South Korea’s Chaebols and Financial System

Chaebols—groups of firms with shared ownership and control, typically run by one family—dominated the Korean economy in the 1990s. There were hundreds of such chaebols prior to the financial crisis in 1997, but the largest five and next largest twenty-five chaebols were generally considered to be in a class of their own in terms of size. The 5 largest chaebols prior to the crises (Hyundai, Samsung, LG, Daewoo, and SK) alone had combined sales of 225 trillion Won in 1996 while total sales of the next largest 25 chaebols were 86 trillion.<sup>4</sup> These sales are significant relative to the size of Korea’s entire gross domestic product at the time, 448.6 trillion Won. The market share of these chaebols, particularly the largest five, facilitated what many considered to be a TBTF belief by investors (Krueger and Yoo, 2002).<sup>5</sup>

Prior to the crisis, most external financing for chaebols and other firms flowed through banks, and the corporate bond market was quite inactive. Corporate bonds issued prior to 1998 were essentially disguised bank loans rather than capital market instruments as Korean banks routinely guaranteed, purchased, and held to maturity most corporate bond issues. Bond investment by banks was an alternative method to extend loans to a specific company when banks could not extend additional loans to a company due to loan exposure regulation.

Following the financial crisis in 1997, however, Korea’s financial markets changed dramatically. In response to the crisis, Korea’s banks dramatically

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<sup>4</sup> We calculate the sales of the largest chaebols using our NICE data, which is described in Section 2.

<sup>5</sup> The chaebols’ enormous size is partially attributed to their success as exporters, combined with subsidized credit from the government, during the 1960s, 1970s, and 1980s. See Krueger and Yoo (2002) for more details.



curtailed their lending. Net financial flows from Korea's financial intermediaries were negative in 1998, indicating net repayment of loans. This drop in bank loans, however, was offset by a surge in bond issuances; net finance flows from bonds in 1998 roughly equaled the net flows through banks before the crisis.<sup>6</sup> A primary driver in the bond market's sudden development was a drawing down of bank deposits by households and the reinvestment of these savings in corporate bonds via investment trust companies (ITCs). Pension funds and insurance companies also became large investors in corporate bonds when they shifted their portfolios away from banks and into corporate bonds. Banks—many of which were taken over by the government because of the crisis—could not compete with the higher interest rates offered by corporate bonds. In January 1998, the 3-year bank deposit rate was 17% whereas the 3-year corporate bond yield (AA rating) was 24%.

At the same time, government policy toward propping up failing banks and firms also changed. The Korean Government, at the insistence of the IMF and the US Treasury, stated there would be no money to protect individual firms, and this was enshrined in the country's Letter of Intent with the IMF at the very end of 1997.<sup>7</sup> These shifts were intended to signal that no firm was TBTF and that government aid would not be forthcoming for troubled firms. These shifts were substantiated by the government's willingness to allow some smaller chaebols to go bankrupt. Hanil, the 27th largest chaebol in 1997, entered bankruptcy in the second half of 1998. New Core and Geopyung, ranked 27th and 28th in size in 1998, also subsequently went bankrupt.

Despite this commitment to not bailout failing firms, the largest chaebols obtained new financing in 1998 rather easily. This was accomplished by their ability to raise significant amounts of capital through bond issues. Anecdotal evidence suggests that households and investors perceived bonds issued by chaebol-affiliated firms to be safe investments irrespective of government commitments to not bail out these firms. The dramatic growth of the

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<sup>6</sup> See Supplementary Appendix Table A.I for details of the Korean corporate sector net finance flows.

<sup>7</sup> From the December 3, 1997, letter (<http://www.imf.org/external/np/loi/120397.HTM>): paragraph 35, "To strengthen market discipline, bankruptcy provisions according to Korean law will be allowed to operate without government interference. No government subsidized support or tax privileges will be provided to bail out individual corporations"; paragraph 17, "All support to financial institutions, other than Bank of Korea liquidity credits, will be recorded transparently in the fiscal accounts"; and the tight fiscal policy laid out in paragraphs 13 and 14. These commitments were reinforced in a second Letter of Intent on December 24, 1997.



bond market slowed only after the government placed a limit on the amount of bonds that chaebol-affiliated firms could issue on October 28, 1998. This limit was implemented out of concerns that the largest chaebols were accumulating large amounts of debt that they would not be able to repay. These concerns were justified in July 1999 when the Daewoo group, the third largest chaebol in Korea at the time and one of the largest issuers of bonds in 1998, declared bankruptcy.

Contrary to the Korean Government's commitment to not bail out firms, lenders to the largest chaebols were eventually protected against losses. After Daewoo's bankruptcy, the Korea Asset Management Company (KAMCO), set up with public funds, purchased Daewoo's non-performing loans and debts. Oh and Rhee (2002) estimate that investors made back 95% of their initial investment in Daewoo because of these and other emergency measures put in place by the Korean government. Hyundai, another large issuer of debt in 1998 also had a *de facto* default in 2000. Unable to rollover its debt, the company was only able to avoid bankruptcy through the government measures initiated in late 2000 in order to avoid another collapse similar to Daewoo. Through these measures, the Korean Development Bank purchased bonds from Hyundai shielding bond investors from potential losses—see Oh and Rhee (2002) for more details.

Why were chaebol-affiliated firms able to issue so many bonds after the crisis and after the government stated there would be no bailouts? Were these financial flows to the largest firms because these firms had better projects at the time, or was it just that investors still saw them as TBTF? To address this question, we now turn to our empirical specification.

## 2. Empirical Specification

To analyze whether TBTF perceptions among bond investors may have contributed to chaebol-affiliated firms' ability to access bonds in 1998, we need to test whether chaebol affiliation is associated with better access to bond financing after controlling for firms' investment opportunities and underlying risk. For example, one relationship of interest is:

$$F_{i,j,T} = \alpha + \beta \cdot P_{i,j,T} + \Gamma \cdot \text{Chaebol}_i + \varepsilon_{i,j,T}, \quad (1)$$

where  $F_{i,j,T}$  is a measure of the bond financing obtained by firm  $i$  in industry  $j$  and period  $T$  (after the crisis),  $P_{i,j,T}$  is a measure of the expected return on the firm's projects in  $T$  (and beyond), and  $\text{Chaebol}_i$  is an indicator for being affiliated with a large chaebol. We are interested in whether  $\Gamma > 0$ , which would suggest better access to capital for chaebol-affiliated firms after

controlling for investment opportunities. Likewise, another relationship of interest is

$$YTM_{i,j,T} = \alpha + \beta \cdot Risk_{i,j,T} + \Gamma \cdot Chaebol_i + \varepsilon_{i,j,T}, \quad (2)$$

where  $YTM_{i,j,T}$  is a measure of the yield-to-maturity offered on bond issues of firm  $i$  in industry  $j$  after the crisis, and  $Risk_{i,j,T}$  is a measure of the underlying risk (absent a government bailout) on the bonds issued by firm  $i$ . Now, we are interested in whether  $\Gamma < 0$ , which would suggest investors perceived chaebol-affiliated firms as TBTF. The problem is that we do not have a good measure of either expected return,  $P$ , or risk,  $Risk$ .

Using post-crisis performance measures to proxy for  $P$  is not appealing as these are likely affected in part by access to finance, causing a potential endogeneity bias. Firms with access to the bond market following the crisis may have performed better simply because they could obtain credit when other firms could not. For example, Daewoo, which issued a large share of the bonds in 1998, was probably able to delay bankruptcy because of its ability to issue bonds. Therefore, using post-crisis performance measures would bias us toward finding a positive correlation between performance and financial access. A similar concern arises in trying to determine whether these bond issues adequately priced a firm's risk.

Using other standard proxies for investment opportunities, such as Tobin's  $Q$ , from before the crisis to proxy for firms' expected return on investments after the crisis is also not appealing. A dramatic change in relative prices following the crisis likely shifted the set of profitable investments to new areas of the economy, and a firm's performance prior to the crisis need not be a strong predictor of its post-crisis expected returns. Using standard measures of risk measured from before the onset of the crisis is also unappealing for the same reason.

To capture differences in investment opportunities and risk across firms, we instead rely on industry fixed effects. Adding industry fixed effects to the above specifications will help control for unobserved investment opportunities and risk attributes at the industry level and ensure that we are only estimating differences in post-crisis access to bond financing *within* industries—in other words, are chaebol-affiliated firms able to borrow more and at better terms than other firms in the same industry?

An additional and attractive proxy for the potential risk and return of a firm's investments following the crisis is a firm's corporate governance structure prior to the crisis. Recent corporate governance literature suggests that corporate governance arrangements matter for firm-level performance (Mitton, 2002; Lemmon and Lins, 2003; Morck, Wolfenzon, and Yeung,

2005), and there is ample evidence that corporate governance mattered for performance specifically in Korea before, during, and after the crisis (Joh, 2003; Baek, Kang, and Park, 2004; Black, Jang, and Kim, 2006). Governance structures also tend to be persistent. Thus, as an additional control for risk and profitability, we will include controls for pre-crisis firm-level governance.

Making use of these ideas, we estimate the following specification:

$$F_{i,j,T} = \alpha + \lambda_j + \beta \cdot G_{i,j,T-s} + \Gamma \cdot Chaebol_i + Z'_{i,j,T-s} \cdot \gamma + \varepsilon_{i,j,T}, \quad (3)$$

where  $F_{i,j,T}$  is the bond financing obtained by firm  $i$  in industry  $j$  and period  $T$ , which is after the crisis;  $\lambda_j$  are three-digit industry fixed effects, and  $G_{i,j,T-s}$  is the corporate governance of firm  $i$  in period  $T-s$ , which is before the crisis; and  $Z'_{i,j,T-s}$  is a vector of firm-level controls, which are all measured before the crisis to ensure they are not endogenously related to post-crisis financial flows. We construct all of our firm-level controls from 1996 data, but all subsequent analysis is robust to constructing our control variables from 1997 data instead. Standard errors are clustered at the chaebol level. We estimate a similar regression for the YTM of bonds issued in 1998.

### 3. Data Description

We now describe the construction of variables we will use in our subsequent analysis. More details on how we construct each variable can be found in Supplementary Appendix Table A.II.

#### 3.1 CHAEBOL MEMBERSHIP

A firm's chaebol affiliation is determined using the KFTC annual publication of the thirty largest chaebols, according to total assets. A firm is classified as chaebol-affiliated based on the 1996 listing of the top 30 chaebols. According to the KFTC, there are 343 firms affiliated with a top 30 chaebol in 1996. Because there is a large distinction between the largest five chaebols and the next largest twenty-five chaebols, in terms of overall size, we also separately identify firms affiliated with a top 5 chaebol and those that are affiliated with the next twenty-five largest chaebols.

There was some merger activity during the period of interest, and it is not clear how exactly to treat a firm that joins or leaves a chaebol. In our base regressions and descriptive statistics, we therefore drop all firms that become a member of a top 30 chaebol during 1997–2000 or leave a chaebol during

1997–98. However, in our robustness checks, we add these firms to the sample and confirm that our results are robust to treating these firms as either non-chaebol or chaebol and clustering the standard errors on either pre- or post-crisis chaebol affiliation.

### 3.2 FINANCIAL FLOWS AND FIRM CHARACTERISTICS

Our measures of firm-level financial flows, that is, bonds, loans, and equity, are derived from operating activity cash flow data reported in a dataset compiled by the NICE. One of the largest Korean credit evaluating firms, NICE compiles and verifies firms' annual financial statements submitted to the Korea Securities Supervisory Board. After excluding observations on financial firms, the NICE dataset contains the financial statements for ~6,400 non-financial firms in 1996 and 8,800 firms by 2000. The NICE financial dataset captures a large share of the Korean economy, and the aggregate pattern of financial flows for firms in the dataset closely mirror those of the entire Korean economy.

The NICE dataset also provides us a number of other firm-level characteristics that will be used as controls in our regressions. The log of total assets is used to control for overall firm size since larger firms naturally borrow more in levels. A firm's leverage ratio, as measured by total debt divided by assets, controls for a firm's level of indebtedness and exposure to risk. We also control for the amount of cash flows (normalized by assets) generated by the firm. To control for the volatility of a firm's cash flow, we also calculate a firm's cash volatility, which is the standard deviation of cash flows/assets from 1994 to 1996. Finally, to capture other potential risk exposures beyond leverage, we calculate firms' modified Altman-Z score.<sup>8</sup>

As expected, chaebol-affiliated firms are much larger and less profitable than non-chaebol firms prior to the crisis. This is seen in Table I, which provides descriptive statistics for the sample of firms in NICE. Firms affiliated with a top 5 chaebol are 3.1 log points larger in total assets than non-chaebol firms and nearly a log point larger than firms affiliated with the twenty-five largest chaebols. Overall, firms affiliated with a top 30 chaebol account for ~40% of total assets and 50% of total sales in 1996. Confirming that the top 5 are much larger than even the next twenty-five largest chaebols and more likely to be considered TBTF, they alone account for 25% of

<sup>8</sup> Following MacKie-Mason (1990), we calculate a modified-Altman Z-score as  $3.3 \times (\text{EBIT}/\text{assets}) + 1.0 \times (\text{sales}/\text{assets}) + 1.4 \times (\text{retained earnings}/\text{assets}) + 1.2 \times (\text{working capital}/\text{assets})$ . Since we do not have stock price data, we are unable to calculate firms' ratio of market equity to book debt, and instead control for book leverage separately.

Table I. Descriptive statistics of firms in 1996

All reported summary statistics are with regards to firm observations in 1996. Standard deviations are presented below the means in parentheses. *Ownership concentration* is the sum of personal shareholder stakes found in the NICE ownership data. The *control-ownership rights gap* is the difference in the total sum of shareholdings for large shareholders and personal shareholding stakes. *Debt/assets* is total liabilities over total assets. *Cash flows* are operating cash flows plus depreciation and minus changes in accruals. *Cash volatility* is the standard deviation of cash flows/assets from 1994 to 1996. The *modified Altman-Z score* is defined as  $3.3 \times (\text{EBIT}/\text{assets}) + 1.0 \times (\text{sales}/\text{assets}) + 1.4 \times (\text{retained earnings}/\text{assets}) + 1.2 \times (\text{working capital}/\text{assets})$ . *ROA* is ordinary income normalized by assets.

	All NICE firms			
	All firms ( <i>N</i> = 6,428)	Top 5 chaebols only ( <i>N</i> = 83)	Top 6–30 chaebols only ( <i>N</i> = 161)	Non-chaebol firms ( <i>N</i> = 6,186)
Log of total assets	16.7 (1.44)	19.7 (2.10)	18.9 (1.76)	16.6 (1.33)
Debt/assets	0.78 (0.29)	0.75 (0.20)	0.83 (0.42)	0.78 (0.29)
Cash flows/assets	0.033 (0.174)	0.040 (0.117)	−0.007 (0.210)	0.034 (0.174)
Volatility (cash flows/assets)	0.116 (0.122)	0.090 (0.121)	0.112 (0.175)	0.117 (0.120)
Modified Altman-Z score	1.44 (1.58)	1.98 (5.11)	0.92 (1.86)	1.45 (1.45)
ROA	0.019 (0.121)	0.011 (0.108)	−0.015 (0.133)	0.020 (0.121)
Ownership concentration (%)	46.3 (35.1)	6.8 (18.1)	12.0 (21.5)	48.1 (34.7)
Control-ownership rights gap (%)	21.2 (33.5)	45.2 (34.4)	48.2 (38.0)	19.8 (32.8)

assets and 36% of sales in our dataset. At the same time, firms affiliated with a top 30 chaebol are less profitable than non-chaebol firms, as captured by a lower ROA in 1996.<sup>9</sup>

### 3.3 CORPORATE GOVERNANCE

To construct our pre-crisis measures of corporate governance, we use the NICE ownership data. This dataset lists the eight largest shareholders and

<sup>9</sup> As seen in Table I, there is also some evidence that chaebol-affiliated were better credit risks before the crisis, as indicated by their lower cash flow volatility and a higher Altman-Z score. In our subsequent tests, however, we will control for these differences directly and using additional proxies for credit risk, including industry fixed effects, corporate governance, and firms' credit ratings.

their ownership stake for a subset of the firms found in the larger financial dataset provided by NICE. Ownership data are available for ~3,500 firms in 1996.

To construct our corporate governance measures, we first calculate the ownership (cash flow) and control rights of the controlling family in each firm. We calculate the ownership rights of the controlling family by summing up all personal holdings among the largest eight shareholders reported by NICE. It is necessary to sum over all personal shareholdings since some shares are often controlled by spouses or family members of the spouse, and it is not possible to distinguish such family connections in Korea as wives do not adopt their husbands' last names. The control rights of these shareholders are then approximated using the total sum of ownership stakes for all eight of the largest shareholders, including the non-personal holdings excluded from the measure of ownership rights. The implicit assumption is that these non-personal shareholdings among the largest shareholders are companies which are indirectly controlled by the founding family of the firm, which is typically the case in Korea.<sup>10</sup>

We use two variables to measure corporate governance: *control-ownership rights gap* and *ownership concentration*. The *control-ownership rights gap* is calculated by taking the difference between the control and ownership rights. This measure captures the degree to which ownership and control rights are aligned within each firm. Firms with a greater gap are more susceptible to misaligned incentives and poor firm performance. Our second measure of corporate governance is the *ownership concentration* of the firm, which is measured using the ownership rights of the controlling family. Controlling shareholders with a larger ownership stake likely face better incentives, and thus, better firm performance.<sup>11</sup> Prior analysis of Korean firms documents that both measures of governance are correlated with firm performance in the expected direction (Mitton, 2002; Joh, 2003; Lemmon and Lins, 2003; Baek, Kang, and Park, 2004), and we find such correlations in our dataset as well.

The summary statistics support the anecdotal evidence that chaebol-affiliated firms exhibit weaker corporate governance structures. As seen in Table I, chaebol-affiliated firms have a much larger *control-ownership gap* and lower *ownership concentration* than non-chaebol firms. The *control-ownership rights gap* is more than twice as large for chaebol-affiliated firms, and

<sup>10</sup> See Joh (2003) for more details on constructing both measures of corporate governance.

<sup>11</sup> The inability of some institutional or smaller shareholders to exercise voting rights under Korean regulations often allows a large shareholder to maintain control with a very small ownership stake.

*ownership concentration* of chaebol-affiliated firms averages only 7–10% compared to 48% for non-chaebol firms in the full sample.

As required for our empirical strategy, the corporate governance measures are also highly persistent over time. From 1993 to 1997, both measures exhibit serial correlation coefficients of  $\sim 0.93$ , and both measures are correlated with firm performance following the financial crisis. Specifically, *ownership concentration* in 1996 is positively correlated with ROA in 1998 while *control-ownership rights gap* is negatively correlated with ROA. This supports our assumption that these measures provide valid proxies for firms' ability to invest funds successfully after the crisis.

### 3.4 BOND ISSUES AND CREDIT RATINGS IN 1998

We obtained data on the YTM at time of issuance for every publicly placed corporate bond in Korea in 1998 along with the amount issued, issue date, and maturity date. In total, there were 1,175 public bond issues in 1998. Using company names, we match the issuance-level data to a firm's financial and chaebol-affiliation data. After doing this and excluding financial firms, we are left with data on 737 bond issues in 1998.

We also obtained the history of credit ratings reported by three of Korea's largest credit rating agencies: NICE, Korea Investors Service (KIS), and Korea Ratings Corporation (KR). Following the financial crises, each issuing firm was required to obtain at least one credit rating. We match these credit ratings to the bond-issuance data using company names and transform each rating into a numerical value. For example, an AAA credit rating is assigned a score of twenty-six, a credit score of AAA– is assigned a score of twenty-five, and so on. If the firm received more than one credit rating and the two ratings differ, we take the average of the two ratings. Of the 737 bond issues that we have both YTM and firm-level data, we are able to match credit ratings for 506 of them. Descriptive statistics of these credit ratings and other bond-issuance characteristics issuances are provided in Table II.

In many regards, the bonds issued by Korean firms in 1998 were homogeneous. Bonds issued in 1998 were straightforward unsecuritized bonds; other types of bonds (e.g., securitized) only became popular after 2001. Moreover, two-thirds of the issuances matured in 3 years, while nearly all the remaining bonds matured in 1 or 2 years (Table II, Panel A). The average maturity also did not differ much across firms based on chaebol-affiliation, and only 6% of issuances had an embedded option allowing the firm to repay the bonds early (Table II, Panel B). The similarity of bonds issued in 1998 actually strengthens our later analysis; the similarity reduces



Table II. Descriptive statistics of bond issuances in 1998

All reported summary statistics are with regards to bond issuances in 1998. Panel A reports the distribution of maturities and credit ratings for bond issuances in 1998. Panel B reports the mean (and standard deviation) of YTM, *maturity*, *credit rating*, and *embedded option* by chaebol affiliation. *YTM* is the yield-to-maturity (in percent) at the time of issuance. *Maturity* is the number of years before the bond matures. *Credit rating* in Panel B captures the average credit rating of a firm's bonds where AAA=26, AAA-=25, and so on to D=0. *Indicator for Embedded Options* equals 1 if the bond issuance had an embedded option.

Panel A: Distribution of maturities and credit ratings					
	<1 year	1 year	2 years	3 years	>3 years
Number of issues by maturity	6	79	153	492	7
	10th	25th	50th	75th	90th
Credit rating percentiles	BB	BB+	BBB+	A	AA-
Panel B: Summary statistics by chaebol affiliation					
	All issuances ( <i>N</i> =737)	Top 5 chaebols only ( <i>N</i> =231)	Top 6–30 chaebols only ( <i>N</i> =174)	Non-chaebol firms ( <i>N</i> =332)	
YTM (%)	15.8 (9.83)	15.1 (5.18)	16.6 (7.67)	15.7 (12.8)	
Maturity (years)	2.59 (0.89)	2.76 (0.64)	2.55 (0.72)	2.49 (1.08)	
Credit rating	17.9 (3.64)	20.4 (2.74)	17.3 (3.24)	15.6 (3.01)	
Indicator for embedded options	0.06 (0.23)	0.02 (0.15)	0.10 (0.30)	0.06 (0.24)	

concerns that any observed differences in the YTM and amounts issued by chaebols are driven by differences in the types and characteristics of bonds being issued by firms. (In our analysis we also control for observed differences in the types of bonds being issued).

There is more variation, however, in the YTM of bond issuances in 1998. The average YTM of a bond issuance in 1998 was 15.8%, and the standard deviation was 9.83% (Table II, Panel B). Firms affiliated with a top 5 chaebol also had a lower YTM at time of issuance relative to non-chaebol firms, but the difference is not statistically significant ( $p$ -value = 0.50).

Credit ratings also varied. The median rating was BBB+, while the 10th and 90th percentile ratings were BB and AA-, respectively. Chaebol-affiliated firms had higher ratings than that of non-chaebol firms.

The average credit rating of firms affiliated with a top 5 chaebol is nearly five ratings better than the average rating of non-chaebol firms ( $p$ -value < 0.001).

## 4. Results and Interpretation

### 4.1 ACCESS TO BONDS IN 1998

Firms affiliated with the largest chaebols received a disproportionate amount of the bond financing in 1998. This is seen in Table III, column (i), where we regress the log of gross bond flows in 1998 onto pre-crisis measures of firm's chaebol affiliation, industry fixed effects, and other firm-level controls for size and leverage. The top 5 chaebol dummy is positive and highly significant. Being a member of a top 5 chaebol is associated with a 1.2 log point increase in gross bond flows for a firm in 1998 relative to other firms in the same industry that also issue bonds in that year. This effect is large. One log point in the gross bond flows regression is about half a standard deviation in our sample, and the average log of gross bond flows in 1998 for all Korean firms is 16.2. The dummy for being a chaebol in the top 30 (but not the top 5) is also significant, though the magnitude of the effect is about one-third of that observed for the largest five chaebols.<sup>12</sup> As expected, size is a strong positive predictor of gross bond flows and leverage is a negative predictor.

The large flow of bond financing to chaebol-affiliated firms does not appear driven by these firms possessing better governance. Using corporate governance structures prior to the crisis as another proxy for firms' post-crisis ability to implement projects successfully after the crisis, we still find a very strong relationship between chaebol-affiliation and gross bond flows [Table III, columns (ii) and (iii)]. The disproportionate access to bonds for firms affiliated with the largest chaebols also suggests that these financial flows were not related to firms' presumed ability to invest the funds successfully. As shown earlier, chaebol-affiliated firms typically had the weakest governance structures and overall profitability prior to the crisis.

Other firm-level differences in risk exposure or access to cash do not seem to explain the preferential access to bond financing for chaebol-affiliated firms. In column (iv) of Table III, we instead use pre-crisis controls for

<sup>12</sup> The smaller coefficient for the next largest twenty-five chaebols likely reflects that TBTF beliefs were less for these firms. As noted earlier, these next twenty-five largest chaebols were considerably smaller than the top 5 chaebols, and the Korean government tried to establish a "no bailout" policy by allowing Hanil, the 27th largest chaebol, to enter bankruptcy in 1998. Our later evidence regarding bond yields also finds less evidence of TBTF beliefs among these twenty-five chaebols.

Table III. Post-crisis bond flows, chaebol affiliation and governance

The table reports coefficients from firm-level regressions of log 1998 gross bond flows (in 1,000s Won) onto three-digit industry fixed effects and pre-crisis firm characteristics using OLS with standard errors clustered around chaebol affiliation. All independent variables are measured with respect to 1996. *Ownership concentration* is Joh's sum of personal shareholdings using the largest eight shareholders identified by NICE. The *control-ownership gap* is Joh's difference between the sum of all large shareholdings and the sum of only personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and top 6–30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997 to 2000 and firms that exit a chaebol from 1997 to 1998 are dropped. *Debt* refers to total liabilities. *Cash flows* are operating cash flows plus depreciation and minus changes in accruals. *Cash volatility* is the standard deviation of cash flows/assets from 1994 to 1996. The *modified Altman-Z score* is defined as  $3.3 \times (\text{EBIT}/\text{assets}) + 1.0 \times (\text{sales}/\text{assets}) + 1.4 \times (\text{retained earnings}/\text{assets}) + 1.2 \times (\text{working capital}/\text{assets})$ . \* = 10% level, \*\* = 5% level, \*\*\* = 1% level.

Dependent variable	Log (bond flows in 1998)			
	(i)	(ii)	(iii)	(iv)
Top 5 chaebol	1.234*** (0.275)	1.352*** (0.355)	1.463*** (0.348)	1.303*** (0.254)
Top 6–30 chaebol	0.516** (0.213)	0.536* (0.289)	0.596** (0.295)	0.579*** (0.211)
Log (assets)	1.004*** (0.049)	1.136*** (0.076)	1.108*** (0.072)	1.027*** (0.053)
Debt/assets	-1.165** (0.570)	-2.021*** (0.699)	-1.887*** (0.629)	-1.059* (0.573)
Ownership concentration		0.251 (0.467)		
Control-ownership gap			-0.586* (0.324)	
Cash flows/assets				1.662* (1.003)
Volatility (cash flows/assets)				2.442 (1.959)
Modified Altman-Z score				-0.002 (0.016)
Industry fixed effects	YES	YES	YES	YES
Observations	504	349	349	476
R <sup>2</sup>	0.75	0.76	0.76	0.76

cash flows, volatility of cash flows, and bankruptcy risk, as measured by the modified Altman-Z score. Again, both chaebol indicators remain a strong positive predictor of bond flows. In unreported regressions, the results are also robust to adding controls for exports/sales and foreign currency borrowings/total liabilities, which suggest that chaebols' ability to issue

bonds is not driven by better export opportunities or better access to international capital markets. We also found that the results are robust to adding controls for cash/assets, R&D expenses, market share, and training expenditures.

One possibility is that chaebol-affiliation simply proxies for overall size. As seen in Table I, chaebol-affiliated firms are much larger than the average firm. Since larger firms are likely to issue more bonds, one must worry that our control of size,  $\log$  (total assets), is insufficient to capture the importance of size. However, the results for chaebol-affiliation in Table III are robust to adding nonlinear size controls to the estimation such as second-, third-, and fourth-order polynomial controls for total assets. The findings are also robust to restricting our sample to only the 500 largest firms, based on total assets in 1996, and re-estimating the equation.<sup>13</sup> The results are also robust to controlling for the size of assets non-parametrically by including fixed effects based on which decile a firm's assets belong to in 1996.

Another possibility, however, may be that investors perceive chaebol-affiliated firms to possess a larger asset base to collateralize the bonds issued by the firm. In particular, chaebol-affiliated firms may benefit from cross-debt guarantees from their affiliated firms, leading investors to view the bonds as potentially backed by the entire group's asset base, rather than just the firm's individual assets. If this were true, then controlling for an individual firm's assets alone will not be sufficient. Additionally, it is possible that investors perceive chaebol-affiliated firms to be safer investments because an entire chaebol's operations will be more diversified than that of any single firm, providing another implicit benefit of any cross-debt guarantees or cross-subsidization within the chaebol. In other words, chaebol-affiliated firms may have access to a large informal internal capital market. If this is true, then controlling for an individual firm's riskiness (such as cash flow volatility or the modified Altman-Z Score) will not adequately capture investors' perception of risk for a chaebol-affiliated firm.

In the crisis, existing cross-debt guarantees stayed in place, but any new debt issue (e.g., in the form of bonds) was not allowed to be cross-guaranteed within a chaebol. This was a condition of the IMF loan that helped stabilize the macroeconomy, and it was viewed as an important element of overall economic policy by the Korean government. There was rigorous enforcement of this rule, which pertained to explicit cross-debt

<sup>13</sup> These estimates are reported in Supplementary Appendix Table A.III. Our findings are also robust to instead using to using net bond finance flows normalized by total assets as the dependent variable instead of  $\log$  (gross bond flows). These estimates are reported in Supplementary Appendix Table A.IV.

guarantees.<sup>14</sup> Implicit cross-guarantees, which might occur through tunneling of cash among group members, is also unlikely to explain our findings since the companies issuing bonds were often the largest in the chaebol—making it unlikely that the other group members had sufficiently deep pockets to bail them out.

To further exclude the possibility that either implicit cross-debt guarantees or access to a larger internal capital market are driving our results, we reestimate our main regression after aggregating chaebol-affiliated firms up to the group level and treating an entire chaebol as just one observation. In particular, we calculate total assets, gross bond flows, and our other controls for cash flows, cash flow volatility, leverage, and bankruptcy risk at the *group* level. If chaebol-affiliated firms have access to a large, diversified internal capital market, our group-level controls, such as the chaebol's total cash flows and the volatility of the chaebol's cash flows, should help control for this. For our corporate governance measures, we use the average ownership concentration and control-ownership rights gap of the group members as the proxy for the entire group. Because it is not possible to classify a group's industry, we do not include industry-year fixed effects. The estimates from these aggregated regressions are reported in Table IV.

The disproportionate access of chaebol-affiliated firms does not appear driven by implicit cross-debt guarantees or access to a large informal internal capital market. As seen in Table IV, column (i), the five largest chaebols still receive a much larger share of bond financing in 1998 at the group level even after controlling for the entire group's level of assets and overall leverage ratio. There is also still a large, positive relation between bond financing and affiliation with a top 6–30 chaebol, though it is no longer always statistically significant at conventional levels. Controlling for corporate governance [columns (ii) and (iii)], and the overall cash flows, cash volatility, and modified Altman-Z score of the group [column (iv)] also does not affect the large, positive relation between bond financing and the chaebol indicators. In unreported regressions, the results are also robust to adding controls for exports/sales, foreign currency borrowings/total liabilities, cash/assets, R&D expenses, and market share. The results are also robust to instead using net bond flows normalized by assets as the dependent variable.

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<sup>14</sup> See paragraph 37 in Korea's December 3, 1997, Letter of Intent to the IMF: <http://www.imf.org/external/np/loi/120397.htm>. In the official IMF summary of the program, the ban on new cross-guarantees (referred to as "phasing out") is in the third bullet point (see <http://www.imf.org/External/np/exr/facts/asia.pdf>). We have checked that this formal language matched the reality on the ground through interviews with Korean government and IMF officials, as well as with people active in the Korean bond market.

Table IV. Bond flows at group level

The table reports coefficients from group-level regressions of log 1998 gross bond flows (in 1,000s Won) onto pre-crisis group-level characteristics using OLS with standard errors clustered around chaebol affiliation. For firms affiliated with a chaebol, all variables are aggregated to the chaebol level, and the chaebol is treated as one observation. All independent variables are measured with respect to 1996. *Ownership concentration* is Joh's sum of personal shareholdings using the largest eight shareholders identified by NICE. The *control-ownership gap* is Joh's difference between the sum of all large shareholdings and the sum of only personal shareholdings using the largest eight shareholders identified by NICE. Top 5 and top 6–30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997 to 2000 and firms that exit a chaebol from 1997 to 1998 are dropped. *Debt* refers to total liabilities. *Cash flows* are operating cash flows plus depreciation and minus changes in accruals. *Cash volatility* is the standard deviation of cash flows/assets from 1994 to 1996. The *modified Altman-Z score* is defined as  $3.3 \times (\text{EBIT}/\text{assets}) + 1.0 \times (\text{sales}/\text{assets}) + 1.4 \times (\text{retained earnings}/\text{assets}) + 1.2 \times (\text{working capital}/\text{assets})$ . \* = 10% level, \*\* = 5% level, \*\*\* = 1% level.

Dependent variable	Log (bond flows in 1998)			
	(i)	(ii)	(iii)	(iv)
Top 5 chaebol	1.620*** (0.272)	1.499*** (0.346)	1.642*** (0.360)	1.715*** (0.358)
Top 6–30 chaebol	0.405 (0.301)	0.492 (0.313)	0.604* (0.318)	0.526* (0.307)
Group-level controls				
Log (assets)	0.988*** (0.043)	1.047*** (0.067)	1.048*** (0.055)	1.011*** (0.049)
Debt/assets	-1.772*** (0.518)	-2.787*** (0.606)	-2.728*** (0.504)	-2.048*** (0.428)
Ownership concentration		0.011 (0.485)		
Control-ownership gap			-0.491 (0.326)	
Cash flows/assets				1.305 (0.964)
Volatility (cash flows/assets)				4.797*** (1.779)
Modified Altman-Z score				-0.062 (0.129)
Observations	415	289	289	393
R <sup>2</sup>	0.66	0.69	0.70	0.67

Overall, the firm- and group-level regressions confirm that bonds were issued in 1998 predominately by chaebol-affiliated firms, particularly firms affiliated with the five biggest chaebols. Moreover, the primary beneficiaries of bonds, firms affiliated with the largest five chaebols, on average, had very

poor corporate governance structures. This evidence runs counter to the notion that bond investors sought out the best firms and instead suggests that TBTF beliefs affected investors' willingness to buy massive amounts of bonds in 1998.

#### 4.2 YTM AND DEFAULT RISK IN 1998

One possibility is that the poor corporate governance and default risk of firms issuing bonds was accounted for in the return of the bonds being issued. To test this, we now regress a bond's YTM at time of issuance in 1998 on industry fixed effects, firm-level characteristics, and bond-level characteristics.

Our analysis includes a variety of bond-level controls to capture the potential importance of differences in the types of bonds issued by firms. To capture any aggregate monthly trend in the risk-free interest rate throughout 1998 for bonds of different maturities, we include month  $\times$  maturity fixed effects in the regression. The inclusion of these interacted month–maturity fixed effects, along with the industry fixed effects, ensures that we are analyzing differences in the YTM of bonds issued by firms in the same industry, and of bonds issued in the same month *and* of the same maturity.<sup>15</sup> We also control for the amount issued and for whether the bond issuance has an embedded option. As discussed in Section 3.4., these are the only two other dimensions, besides maturity, in which bonds issued in 1998 differed; by controlling for these few differences, we can ensure that our subsequent findings are not driven by differences in the types of bonds being issued by firms. These regressions are reported in Table V.

Overall, firms affiliated with a top 5 chaebol actually paid a lower YTM on their bonds in 1998. On average, top 5 chaebol-affiliated bonds were issued at a YTM  $\sim$ 0.9 percentage points less than other firms in the same industry [Table V, column (i)]. The negative association between YTM and top 5 chaebol affiliation becomes even larger after controlling for firm size and leverage [column (ii)]. The negative correlation suggests investors perceived the bonds issued by firms affiliated with the top 5 chaebols to be less risky. There is no evidence that firms in the twenty-five next largest chaebols issued bonds at lower YTM.

<sup>15</sup> An alternative way to control for changes in the risk-free rate over time would be to instead use a bond's credit spread as the dependent variable rather than YTM (i.e., transform the dependent variable, YTM, by subtracting off the risk-free rate of bonds of similar maturity). Our approach of using month  $\times$  maturity fixed effects, however, is more general in that it will also control for any other unobserved heterogeneity across time for bonds of different maturities (Gormley and Matsa, 2014).



Table V. Bond YTM, chaebol affiliation, and default risk

The table reports coefficients from bond-issuance level regressions of 1998 bond YTM onto three-digit industry fixed effects, month  $\times$  maturity fixed effects, bond-level characteristics, and pre-crisis firm-level characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variable is the YTM of bonds (in percent) at the time of issuance in 1998. Bond-level controls include an indicator that equals 1 if the bond has an embedded option, and log (amount issued). *Credit rating* captures the average credit rating of a firm's bonds where AAA = 26, AAA- = 25, and so on. *Bankruptcy* equals 1 if a firm declared bankruptcy between 1999 and 2001. All other firm-level controls are measured with respect to 1996 levels, and their definitions are the same as in earlier tables. \* = 10% level, \*\* = 5% level, \*\*\* = 1% level.

Dependent variable	YTM of bond issue						
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Top 5 chaebol	-0.910*	-1.325***	-1.324**	-1.171*	-1.415***	-1.453*	-1.289***
	(0.512)	(0.497)	(0.627)	(0.708)	(0.531)	(0.748)	(0.493)
Top 6-30 chaebol	0.352	0.053	0.534	0.739	-0.101	0.647	0.106
	(0.650)	(0.650)	(0.699)	(0.611)	(0.689)	(0.714)	(0.650)
Embedded option	-0.227	-0.308	-0.397	-0.406	-0.331	-0.512	-0.314
	(0.691)	(0.683)	(0.674)	(0.673)	(0.688)	(0.691)	(0.676)
Log (amount issued)	-0.187	-0.279	-0.504*	-0.501*	-0.267	-0.233	-0.305*
	(0.122)	(0.178)	(0.263)	(0.258)	(0.187)	(0.300)	(0.178)
Log (total assets)		0.205	0.478	0.496	0.252	0.646*	0.188
		(0.201)	(0.326)	(0.330)	(0.184)	(0.330)	(0.199)
Debt/assets		2.907***	2.252	2.279	2.702**	0.574	2.705**
		(1.119)	(1.421)	(1.444)	(1.209)	(1.851)	(1.124)
Ownership concentration			-2.827				
			(4.247)				
Control-ownership gap				0.458			
				(1.271)			
Cash flows/assets					-2.368		
					(2.425)		
Volatility (cash flows/assets)					2.505		
					(2.707)		
Modified Altman-Z score					-0.045		
					(0.032)		
Credit rating						-0.017	
						(0.097)	
Eventual bankruptcy							0.834*
							(0.477)
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES
Month $\times$ maturity FE	YES	YES	YES	YES	YES	YES	YES
Observations	737	737	482	482	722	506	737
R <sup>2</sup>	0.81	0.81	0.74	0.74	0.81	0.80	0.81

The lower YTM on the bond issues of chaebol-affiliated firms is robust to including additional controls for default risk. Top 5 chaebol affiliation is still negatively related to YTM after controlling for firms' pre-crisis corporate governance [Table V, columns (iii) and (iv)] and cash flows normalized by assets, cash flow volatility, and modified Altman-Z score [Table V, column (v)]. In unreported regressions, we also find the negative correlation is robust to controlling for firm's potential exposure to exchange rate fluctuations, as captured by exports/sales and foreign currency borrowings/total liabilities. Affiliation with a top 5 chaebol also remains a strong, negative predictor of YTM after controlling for firms' credit ratings [Table V, column (vi)]. This indicates that chaebol-affiliated firms were able to issue bonds at a lower YTM relative to firms of similar industry, size, leverage, and credit rating.<sup>16</sup>

The lower YTM of bonds issued by the top chaebols in 1998 is also robust to controlling for whether the issuing firm eventually defaulted. If we instead proxy for a bonds' risk using ex-post data on which firms actually declared bankruptcy between 1999 and 2001, we find a significant, positive correlation between eventual default and YTM at time of issue in 1998 (which is consistent with investors pricing default risk), but affiliation with a top 5 chaebol is still negatively related to the YTM of bond issues [Table V, column (vii)].<sup>17</sup> Moreover, in unreported tests, we find that the positive association between eventual default and YTM at time of issuance is only present for non-chaebol firms; in fact, there is *negative* association between eventual default and YTM in 1998 for firms affiliated with a top 5 chaebol.

There is also no evidence that chaebol-affiliated firms, absent a government bailout, were less likely to eventually default on their bonds; if anything, we find that chaebol-affiliated firms were *more* likely to default.

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<sup>16</sup> The lack of significant, negative correlation between YTM and credit ratings is likely explained by our inclusion of other firm-level controls for leverage, size, and industry. The ability of firms to engage in credit rating shopping in 1998 and investors' awareness of this problem may also explain the weak relationship between credit ratings and YTM. Prior to 1999, Korean firms only needed to obtain a credit rating from one of the three main credit rating agencies, which provided these agencies an incentive to provide favorable ratings in order to attract business. Despite the potential for credit rating shopping in 1998, there is evidence that credit ratings were predictive of future defaults for non-chaebol firms; among these firms, we find a significant, negative correlation between credit ratings and an indicator for eventual default. For chaebol-affiliated firms, however, the correlation is positive, suggesting that chaebol-affiliated firms that eventually defaulted actually received better credit ratings in 1998 relative to chaebols that did not default.

<sup>17</sup> The higher YTM at time of issuance for firms with greater leverage and for firms that eventually defaulted also suggests that our findings are not driven by a lack of experience among investors in the nascent bond market.

In a regression of an indicator for eventual default onto our chaebol affiliation dummy, monthly dummies, and industry dummies, we find that bonds issued by firms affiliated with a chaebol were actually more likely to experience an eventual default. While the estimate is not statistically significant at conventional levels ( $t$ -stat = 1.2), bonds issued by top 5 chaebol firms were 8.5 percentage points more likely to experience default. Bonds issued by the next largest 25 chaebols were 1.2 percentage points more likely to experience default, but again the estimate is not statistically significant ( $t$ -stat = 0.44).

The lower YTM of chaebol-affiliated firms also does not appear driven by their potential access to a large, informal internal capital market. As noted earlier, this might occur if chaebol-affiliated firms are able to access cash flows from other members of the chaebol despite explicit regulations forbidding such cross-debt guarantees. If investors believe such internal transfers are possible, they may be willing to lend to chaebol-affiliated firms at a lower YTM. To control for this possibility, we replace the firm-level controls with the chaebol-level equivalent of these controls for chaebol-affiliated firms. For example, we replace the size and volatility of issuing chaebol-affiliated firm's cash flows with the size and volatility of the *entire* chaebol's cash flows (which are much larger and less volatile). These regressions are reported in Table VI.

Even after controlling for the characteristics of the entire chaebol, we still find that chaebol-affiliated firms issued bonds with a lower YTM in 1998. Controlling for the size, leverage, cash flows, volatility of cash flows, and modified Altman-Z score of the chaebol (along with our standard set of bond-level controls, industry fixed effects, and month  $\times$  maturity fixed effects), firms affiliated with a top 5 chaebol issued bonds, on average, with a YTM that was 1.2 percentage points lower than that of other firms [Table VI, column (i)]. The lower YTM of chaebol-affiliated firms is also robust to controlling for the issuing firm's credit rating and for whether the issuing firm eventually defaulted [column (ii)], or to instead controlling for the average credit rating of the chaebol [column (iii)]. In unreported results, we also found the results are robust to controlling for the maximum (rather than the average) credit rating of the group and to controlling for the chaebol-average of our corporate governance measures.

These findings are striking in that they are the opposite of what one would expect to find in a well-functioning bond market. Not only were the largest finance flows being directed toward firms with the worst corporate governance, it would appear investors perceived these to be safe investments—in that bonds issued by chaebol-affiliated firms sold at a premium relative to other bonds. In fact, chaebol-affiliated firms that did eventually default, such as Daewoo and Hyundai, actually sold debt at a greater premium than

Table VI. Bond YTM at group level

The table reports coefficients from bond-issuance level regressions of 1998 bond YTM into three-digit industry fixed effects, month  $\times$  maturity fixed effects, bond-level characteristics, and pre-crisis group-level characteristics using OLS with standard errors clustered around chaebol affiliation. Dependent variable is the YTM of bonds (in percent) at the time of issuance in 1998. Bond-level controls include *Embedded Option*, which is an indicator that equals 1 if the bond has an embedded option, and log (amount issued). All other controls are measured with respect to 1996 levels, and for firms affiliated with a chaebol, these controls are aggregated to the chaebol level. For example, *debt/assets* reflects the leverage of the entire chaebol rather than the leverage of the chaebol-affiliated firm that actually issued the bond, and the group's credit rating is constructed using the group's average in 1998. Top 5 and top 6–30 chaebol indicator variables are determined using the 1996 KFTC listing of the top 30 chaebols. Firms entering a top 30 chaebol from 1997 to 2000 and firms that exit a chaebol from 1997 to 1998 are dropped. \* = 10% level, \*\* = 5% level, \*\*\* = 1% level.

Dependent variable	YTM of bond issue		
	(i)	(ii)	(iii)
Top 5 chaebol	-1.178* (0.630)	-2.568** (1.204)	-1.981** (0.941)
Top 6–30 chaebol	-0.024 (0.668)	0.178 (0.776)	0.469 (0.638)
Embedded option	-0.336 (0.681)	-0.466 (0.746)	-0.269 (0.648)
Log (amount issued)	-0.214 (0.164)	-0.415 (0.312)	-0.262 (0.203)
Eventual bankruptcy		1.697*** (0.625)	1.681*** (0.563)
Credit rating		0.032 (0.113)	
Group-level controls			
Log (total assets)	0.107 (0.153)	0.722** (0.286)	0.623** (0.241)
Debt/assets	3.044* (1.560)	-1.131 (2.642)	-1.016 (2.529)
Cash flows/assets	-6.362** (3.029)	-9.086** (3.62)	-7.494** (3.511)
Volatility (Cash flows/assets)	9.591 (5.900)	15.427* (8.604)	11.875 (8.188)
Modified Altman-Z score	0.041 (0.249)	-0.073 (0.318)	0.073 (0.272)
Credit rating			-0.137 (0.111)
Industry fixed effects	YES	YES	YES
Month $\times$ maturity FE	YES	YES	YES
Observations	717	498	588
$R^2$	0.81	0.80	0.80

bonds issued by firms affiliated with other chaebols. Overall, the pricing evidence is consistent with investors ex-ante regarding these corporate bonds as safe investments and the large chaebol-affiliated firms as TBTF in 1998.

#### 4.3 YTM AND BOND FLOWS AFTER BAILOUTS IN 2000

We now test whether the government bailouts in late 2000 were associated with an increase in the evidence of TBTF beliefs in the Korean bond market. As discussed in Section 1, the Korean government announced emergency measures in December 2000 that effectively shielded bond investors against losses following the bankruptcy of Daewoo in 1999 and the *de facto* default of Hyundai in 2000. By confirming the government's unwillingness to allow these large conglomerates to default on their debt obligations (because of the significant losses this would impose on investors such as pension funds, banks, and ITCs), these emergency measures may have strengthened investors' perception of the chaebol-affiliated firms as TBTF, and if true, then chaebols may have enjoyed improved access to bond markets beginning in 2001.

Consistent with TBTF beliefs increasing after the government bailouts in 2000, we find that, compared to non-chaebol firms, bond issuances by firms affiliated with the top 5 chaebols increased relatively more after 2000, and that the relative YTM on these issuances also declined. Specifically, after including our standard controls for bond-issuance size, credit rating, whether the bond had an embedded option, month-maturity fixed effects, and industry fixed effects, we find that the YTM on bonds issued by chaebol affiliated firms was 0.87 percentage points lower beginning in 2001 ( $p$ -value = 0.095).<sup>18</sup> We also find that average amount of bonds issued by firms affiliated with a top 5 chaebol increased 0.34 log points after 2001 ( $p$ -value = 0.015). (Again, we include our standard set of controls for size, leverage, and industry). These estimates are consistent with an increase in TBTF beliefs after 2000.

## 5. Conclusion

Our evidence suggests that Korean investors were willing to buy corporate bonds during the Korean banking crisis of 1997–98 because they regarded

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<sup>18</sup> Our sample includes 617 bond issuances in 2000, 2001, and 2002, and chaebol-affiliation is defined based on firms' affiliations as reported by the KFTC in 2000. Moreover, while we find a differential change in the YTM of firms affiliated with a top 5 chaebol in 2001, we do not find a change in the YTM of bonds issued by firms affiliated with a top 6–30 chaebol.

the largest chaebols as TBTF. There is no evidence that the bond market allocated credit to firms more likely to make better use of the funds, and there is also no evidence that default risk was appropriately priced. Chaebol-affiliated firms issued larger amounts of bonds relative to other firms in the same industry. Moreover, the large chaebol-affiliated firms receiving the most bond financing in 1998 actually had the worst corporate governance prior to crisis and the highest eventual default rates, suggesting they would be least able to invest the funds successfully. These chaebol-affiliated firms were also able to issue bonds with a lower YTM relative to that of other firms. In fact, firms affiliated with Daewoo, a huge chaebol that did eventually default, actually issued bonds in 1998 with a lower YTM than firms affiliated with other chaebols.

These TBTF beliefs persisted despite serious efforts of the Korean Government to credibly commit to not bailing out these firms. In retrospect, the market beliefs were correct. When some of the largest chaebols were unable to meet their debt obligations in 1999 and 2000, the Korean Government undertook a large-scale intervention to protect creditors from losses—taking the view that this was necessary in order to prevent another financial crisis. As a result, the bond investors who had invested in these chaebols largely recouped their investments. The Korean experience suggests that governments may have great difficulty convincing investors that no firm is TBTF. It also strongly suggests that TBTF problems are not necessarily limited to financial sector firms.

Korea's experience also highlights the ability of large, vested interests to continue their expansion even in the face of a crisis. Funding after the Korean financial crisis was more concentrated than before the crisis, despite the fact that the crisis was due in part to large chaebol firms over-expanding based on cheap credit. Smaller firms, even those with better corporate governance structures, were unable to access the new capital markets when banks stopped lending. The net effect of the crisis, therefore, was to help large firms relative to small firms. Economic power became even more concentrated as a result, further perpetuating investors' beliefs that the large firms were "too big to fail". Rather than breaking the power of chaebols, the immediate effect of the crisis—at least in terms of financial flows—was to help further the strongest pre-crisis special interests.

## Supplementary Material

Supplementary data are available at *Review of Finance* online.

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