#### Who, When, and How Much Corporate Parents Help: Evidence from Japanese consolidated and unconsolidated financial statements<sup>1</sup>

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#### Abstract

We derived annual amounts of internal and of external lending by individual, Japanese companies for 1984-2014. We used their unconsolidated and consolidated data to calculate the annual amounts of longer-term loans that parent companies extended to their separately-incorporated, subsidiary companies and to companies outside their business groups. We controlled for the effects of parent-specific and of subsidiaryspecific factors on internal lending.

We found that, when banks or the economy generally had problems, parents lent more internally, especially to their more important subsidiaries. Internal lending rose when banks were more willing to lend to parent-sized companies and when banks were less willing to lend to subsidiary-sized companies, which tended to be smaller than their parents. Our results suggest that internal capital markets partially offset some shocks.

Our results also suggest considerable internal competition for funds. Parents lent more internally when they recently invested less themselves or when their subsidiaries had invested more. Loan from parents also rose when subsidiaries' sales rose to companies outside their business group. However, when they sold more to outside businesses, parents then lent less internally.

**Keywords:** Business groups; internal lending; parent company; subsidiaries; unconsolidated

<sup>&</sup>lt;sup>1</sup> We thank Takeo Hoshi, Takemi Ono, Yoshiaki Jinnnai, Akiyoshi Watanabe, Peng Xu, Hidetomo Takahashi, Hironori Fukukawa, Makoto Nakano, Tetsuyuki Kagaya, and seminar participants at Stanford University, Hosei University, Tokyo Keizai University, and Hitotsubashi University for helpful comments and suggestions. The authors declare that they have no relevant or material financial interest related to the research herein.

#### 1. Introduction

The recent global financial crisis sparked research interest, policy proposals and actions, and business concerns about the amount and volatility of the supply of credit. Recent studies analyzed how much the supplies of credit from shadow banks and from commercial banks changed before, during, or after the Global Financial Crisis (GFC). Results very often pointed to both shadow and commercial banks" tightening credit supplies in various ways.

Apart from these credit sources that were external to borrowers, internal capital markets may allocate funds within companies. We expect that such internal allocations would occur both when macroeconomies are tranquil and, perhaps more so, when they are turbulent, as during the GFC. In addition to reducing the adverse effects of occasional eruptions of financial frictions, internal allocations may also attempt to accommodate typical variations in cash flows. Several studies concluded that companies consciously reallocated funds across business units whose cash flows and additional investment opportunities were imperfectly correlated.

Empirical studies have typically relied on indirect evidence that companies have consciously and efficiently shifted funds internally. Evidence has been indirect because of the virtual absence of data for internal transactions. While some studies have used them, segment data for U.S. corporations do not have any lending or equity variables and some studies have questioned whether their measurement errors importantly affect conclusions about internal capital markets.<sup>2</sup>

Due to data limitations, we have not had direct estimates of the amounts, by company, of internal capital allocations for long time periods for many, large companies.<sup>3</sup> Data limitations then also precluded measuring the size and volatility of internal lending, and thus estimating how much various factors accounted for the time-series or the cross-section variation of internal capital markets. Below we describe our attempts to fill those gaps.

<sup>&</sup>lt;sup>2</sup> See Givoly, et al. (1999) and Bens, et al. (2011).

<sup>&</sup>lt;sup>3</sup> The internal loan data for Indian companies in Gopalan, Nanda, and Seru (2007) may be the exception.

Data availability was a paramount consideration for us too. Some countries have required that the parent companies of business groups provide financial statements for the business group on a consolidated basis, but also required that they provide them for the parent company alone and, under some circumstances, for some of the subsidiary companies within a parent's business group.

A number of empirical analyses found evidence for internal capital markets and their responding to external shocks: Maksimovic and Phillips (2013) provided a valuable survey of the rationale and evidence for internal capital markets and for corporate conglomerates; Recently, Cho (2015), Dewaelheyns, et al. (2010), Gopalan and Xie (2011), Kolasinski (2009), Matvos and Seru (2014), and Ozbas and Scharfstein (2010), among others, concluded that internal capital markets re-allocated funds across business units.

Two of the most recent studies of internal capital markets concluded that corporate parents provided financial aid to their subsidiary companies via increased trade credit and via equity purchases. Buchuk, et al. (2014) undertook the arduous task of hand-collecting data that directly measures of the flows of (net) trade credit across the subsidiary companies within business groups. They analyzed trade credit (i.e., net trade credit, equal to accounts receivable minus accounts receivable) at more than 1000 Chilean companies for the years 1990-2009. They found that, within a business group, companies that received larger net flows of trade credit had larger capital expenditures, more leverage, and higher return on equity.

Using data from years soon before and soon after the Asian financial crisis of the late 1990s, Almeida, et al. (2015) analyzed internal equity flows at over 200 Korean business groups (*chaebols*). They found that companies bought or sold more equity to other companies in their chaebol after than they did before the crisis. They also concluded that equity was purchased by (expected) low-growth companies from high-growth companies in the same *chaebol*.

Rather than focusing on equity investments or trade credit, we focused on a large, but less-well-known, form of business lending: loans from a parent company to its subsidiary companies. To the literature on internal capital markets, we add direct measures of internal lending and estimate how much internal lending responded to

economic and financial crises, to the importance of parents and their subsidiaries to each other, to uses and sources of funds, and other factors.

Figures 1 and 2 show that consolidated balance sheets obscure the large, fluctuating lending markets that operated within large Japanese business groups. They also show the size and fluctuations of the external lending done by parent and by subsidiary companies. Using the same scale for each fiscal year from 1984 through 2014, Figures 1 and 2 plot Japanese companies' aggregate internal and external lending, as a percent of parent companies' aggregate total assets. Panel A in Figure 1 shows consolidated, or external, lending, which is the sum of parents' and of subsidiaries' lending to companies outside their business group. Through 2002, external lending hovered in the range of two to three percent. External lending then quickly declined to about one percent of parent companies' assets and was below one percent for during FY2010 – FY2014. Unconsolidated lending followed a very different path. Panel B shows that the sum of parents' internal lending, i.e., lending to their subsidiaries, and parents' external lending, was noticeably larger, more volatile, and, after 2000, growing.<sup>4</sup>

## (Figure 1 near here) (Figure 2 near here)

Figure 2 shows the elements that comprise the consolidated and unconsolidated lending ratios in Figure 1. Panel A in Figure 2 shows the ratio to parents' total assets of loans that parents made to their subsidiary companies. Panel A shows that internal lending was by far the largest component of parents' lending. Parents' loans to their own subsidiaries hovered in the range of three to four percent of parents' assets until the late 1990s. Then parents' internal lending ranged from five to seven percent through FY2007, which ended on March 31, 2008. Internal lending then rose to about eight percent and then exceeded eight percent of parents' assets for FY2012 – FY2014.

Panels B and C show parents' and their subsidiaries' external lending. The sum of these two elements equal external lending, which we showed in Panel A of Figure 2.

<sup>&</sup>lt;sup>4</sup> Some of the increase in the level after 2000 of the ratio shown in Panel B likely stemmed from a new accounting rule that clarified the scope of parent companies' subsidiaries.

Panel B shows that parents' external lending fairly steadily dwindled over our sample period, before ticking upward slightly in FY2013 and FY2014. Subsidiaries' external lending was quite small throughout FY1984 – FY2014, except for a few years around FY2000.

Thus, Figure 1 shows how much internal lending might be obscured by consolidated balance sheets. Figure 2 shows that even parents' total unconsolidated lending could importantly obscure the size and fluctuations of internal lending. As it happened, however, parents' lending to companies outside their business groups was relatively stable and small. Thus, as shown in panel A in Figure 2, parents' internal lending was large, volatile, and growing.

Based on data for large, listed (i.e., publicly traded) nonfinancial, Japanese business groups, we calculated that parent companies' loans outstanding to their subsidiaries averaged about five percent of parents' assets. Our calculations also showed that these internal loans differed significantly across companies and fluctuated considerably over time.

Next, after discussing some of the factors that we deemed likely to determine parents' lending to their subsidiary companies, we present estimates of how much more parent companies lent to their subsidiaries when commercial banks were less willing to lend. Our annual data for 1984-2014 included many years without crises in Japan and also included the several eras of Japanese banking and economic crises during the past three decades.

We found that, during the economic crises after the accounting reform in 2000 in Japan, parents lent more to their subsidiary companies. We found that parents' internal, but not external, lending rose when banks were <u>more</u> willing to lend to <u>parent-sized</u> companies and when banks were <u>less</u> willing to lend to <u>subsidiary-sized</u> companies. In a similar vein, internal lending also rose during Japan's financial and economic crises, and then rose more to more important subsidiaries. Our results suggest that there was considerable internal competition for funds. Parent companies lent more internally when they invested less themselves or when their subsidiaries invested more. Parents also lent more internally when their subsidiaries' sales rose to companies outside their business

group, but they lent less to their own subsidiaries when they sold more to outside companies.

Section 2 describe the form and accounting for Japanese business groups. We also provide examples of internal lending. Section 3 discusses rationales for internal capital markets, and for internal lending markets in particular. In Section 4, we present hypotheses that our estimates bear upon. Section 5 discusses and shows our specifications, data, and sample. Section 6 presents and discusses our estimates for internal and external lending. Section 7 summarizes our results, discusses implications, and suggests avenues for further analysis.

#### 2. Business Groups, Parents, Subsidiaries, and Accounting

As we describe in more detail below, for our purposes, a business group consists of a parent company and the companies that the parent (often wholly) owns or controls enough that the parent is required to report consolidated financial statements, which combine the financial statements of those subsidiary companies into those of their parent company. And, we will refer to loans from a parent to its subsidiary (or related) companies as "internal lending." We refer to loans from a parent company or from its subsidiaries to companies outside their business group as "external lending."

#### 2.1 Business organizations

In response to the wide range of business situations, a wide range of business organizational forms are used to efficiently measure and manage companies. For management purposes, companies that span wide ranges of physical territory or of activities often delineate business lines, divisions, regions, or other units. Although delineating business units within a company may serve internal purposes, such units need not, and typically do not, have any separate legal status. Absent some legal or other formal delineation, individual or collected units seldom are subject to separate reporting requirements, taxation, or regulation.

On the other hand, legally-separate companies may combine with other companies. When companies are combined somehow, their financial reporting requirements often depend upon the extent of ownership or control that one company has

over other companies. Below we make use of the data provided by accounting requirements for combinations of Japanese companies.

#### 2.2 Parent and subsidiary companies

A business group consists of one parent company and one or more subsidiary companies that the parent controls.<sup>5</sup> Unlike divisions or other business units that are delineated only for internal purposes, subsidiaries are separately incorporated. Subsidiaries may be wholly, majority, or even minority owned by parents.<sup>6</sup> Typically, control is evidenced by a parent's having purchased sufficient voting equity shares in a subsidiary company. Very often subsidiaries are overwhelmingly or wholly owned by their parents. Like informal business units, the sizes of subsidiaries, as measured by their sales or assets for example, can range from very small to very large, both in absolute terms and relative to the sizes of their own parents.

Since the accounting reforms commonly referred to as the 'Accounting Big Bang', Japanese companies began following a new accounting standard that requires consolidated rather than parent-only earnings in financial reports. The subsequent introduction of new company law that clarifies the scope of subsidiaries for parent firms. The new company law went into effect in 2006.

Rather than being small, unusual, or idiosyncratic, parent companies with consolidated subsidiaries, i.e., business groups, have been the dominant form chosen by Japanese companies for decades. Here, for example, are data for the end of the 2005 fiscal year (FY2005), a date that was about two-thirds of the way through our FY1984 – FY2014 sample period and was before the Global Financial Crisis. We had data for 2,622 listed, nonfinancial companies for that date. Of those 2,622 businesses, 2,261 (or 86 percent) had (consolidated) subsidiaries and filed both unconsolidated and consolidated financials. Only 361 of the 2,622 listed, nonfinancial businesses had no subsidiaries.

<sup>&</sup>lt;sup>5</sup> In contrast to a business group, a keiretsu is an alliance of Japanese companies or business groups, that typically have a common main bank, have some common commercial interests, and, though they may hold some of other members' shares, do not have ownership-based or other formal control over the other business groups in their keiretsu.

<sup>&</sup>lt;sup>6</sup> Companies that are partially owned by other companies are sometimes listed on stock exchanges, have publicly-traded shares, and are required to disclose their financial statements.

Of the 2,261 listed companies that had subsidiaries, on average each parent company had about 21 subsidiaries. The minimum number of subsidiaries in FY2005 was one; Sony then had the most: In FY2005, Sony had 936 subsidiaries. Business groups with many and large subsidiaries may also predominate the corporate sectors of other major countries, but it is hard to know. For example, in the case of the U.S., we don't have comprehensive databases of financial statements for parents separately from their consolidated subsidiaries.

Parents often owned overwhelming shares of their subsidiaries: Subsidiaries were very often wholly owned by parents and, on average, parents owned about 85 percent of the total equity of their subsidiaries. (We calculated the parent's percentage of ownership of its subsidiaries as the ratio of unconsolidated equity to the sum of unconsolidated equity and minority interest.) A parent's not owning 100 percent of a subsidiary's equity opened the door to the subsidiary's being listed, having its shares publicly traded, and disclosing financial statements. Whether parents' ownership percentages affected their lending to their subsidiaries is one of the issues that we address and estimate below.

#### 2.3 Accounting for business groups

When a parent company's ownership or control of a company is deemed large enough, accounting rules require the parent to report financial statements for the business group that consolidate these subsidiaries with the parent. In Japan, because parents typically have enough ownership or control of their subsidiaries, overwhelmingly subsidiaries are consolidated into the financial statements of their business groups.

Consolidation of subsidiaries' financials with those of their parents obscures most intra-group transactions, i.e., transactions between parents and their subsidiaries and transactions between subsidiaries. As accounting textbooks phrase it, within-businessgroup transactions are "eliminated" by consolidations: They do not appear in the income statements or balance sheets of the business group. In their advanced financial accounting textbook, Baker, et al. (2008) cogently summarize the logic and implications of eliminating internal transactions when financial statements are consolidated: "you can't owe yourself money", "you can't sell to yourself", and "you can't own yourself."

Otherwise, for example, together parents and subsidiaries could manipulate revenues as much as the business group wanted by repeatedly buying and selling the same goods or services back and forth between themselves.

Analysts can reasonably argue that, by eliminating internal transactions, consolidated financial statements are likely to provide more signals and less noise about business groups. That so many subsidiaries are wholly owned by their parents and thus don't have publicly traded equity further reduces demand for information about subsidiaries. Below we provide more detailed explanations and numerical examples of unconsolidated and consolidated financial statements.

U.S. accounting rules require (publicly-traded) business groups to report consolidated financials. U.S. rules do not require a business group to provide separate financial statements for the parent company or for the subsidiary companies. Not requiring separate financial statements for parents and for subsidiaries may be analogized to not requiring separate financials for informal business units, which are often as integral to a single company as subsidiaries are to a business group. Companies and business groups in the U.S. are free to do so, but rarely do they disclose comprehensive separate financial statements for internal business units or even for subsidiaries. The result is that any loans, trade credit, equity investments, sales, purchases, and other transactions within a business group do not appear in consolidated financial statements.

Fortunately, for some times and places, business groups have been required to report both their consolidated and their unconsolidated statements, the latter of which pertain directly only to the parent company.<sup>7</sup> Japan is one example. In recent decades, Japanese business groups had to report both (parent-only) unconsolidated and (group-wide) consolidated financial statements.<sup>8</sup> We used both sets of financial statements, along with footnotes to the unconsolidated balance sheets, to calculate internal transactions at Japanese business groups.

<sup>&</sup>lt;sup>7</sup> Shuto (2009) investigates earnings management both in the unconsolidated earnings and consolidated earnings of Japanese companies. Bonacchi et al. (2014) focused on the relations among consolidated, unconsolidated and subsidiaries financial statements to reveal the earnings management by parent company using Italian companies.

<sup>&</sup>lt;sup>8</sup> Although Japanese companies can register with the U.S. SEC and then opt to abide by U.S. accounting rules, in recent years only about 30 of the more than 1,400 business groups in our sample each year chose to do so. To remain in our sample, of course, Japanese business groups still had to have reported both consolidated and unconsolidated financial statements.

We focused particularly on calculating (unbalanced panel) annual data by business group for the loans that each parent company had extended to its (consolidated) subsidiaries *in toto*. We also calculated how much each parent and how much its subsidiaries had lent to companies outside their business group. That is, we calculated lending from parents to their "corporate children" and from parents and from children to companies outside the family, but not between "sibling subsidiaries." Below, for Japanese business groups, we show that business lending from parents to children can be substantive, frequent, and volatile.

#### 2.4 Internal and External Lending: Consolidated, Unconsolidated, and Estimated

Unlike U.S. companies, Japanese companies are required to report both consolidated and also unconsolidated financial statements. And, Japanese companies are also required to report, at least in footnotes, various material transactions. While they intend to reflect financial performance and conditions of a business group as a whole, consolidated financial statements also "eliminate" transactions that occur within a business group between the group's parent company and its subsidiary companies. Consolidation also eliminates (reporting of) transactions between subsidiaries. Although they actually take place between separately incorporated companies, we refer to these transactions within a business group as "internal" transactions.

While accounting rules eliminate their being reported in consolidated financial statements, the rules do not, of course, eliminate the actual transactions. It is the combination of consolidated and unconsolidated statements (and their footnotes) that allowed us to uncover the amounts of lending, internal and external (to companies outside the business group), done by business groups, by parents, and by subsidiaries. They enabled us then to estimate both the size and volatility of internal and external lending. They also let us analyze the extent to which factors internal and external to business groups affected how much internal lending they did.

Figure 3 illustrates how consolidating subsidiaries eliminates, not the internal transactions themselves, but their being reported. The business group in the box in Figure 3 shows that this parent company has three (consolidated) subsidiaries. Arrows A and B represent external lending by the parent and by its subsidiaries, i.e, loans they made to

companies outside of their business group. Arrow B<sub>3</sub>, for example, indicates that Subsidiary 3 made 1 unit of loans externally, perhaps, though not necessarily, to its customers or to suppliers. Here, we refer to loans, but the accounting also pertains to accounts payable and accounts receivable. We have data both for loans and for receivables and for payables. The assets reported on the consolidated balance sheet for this business group would show 5 units of (external) loans were outstanding: A+B = 2 +(0+2+1) = 5.

#### [Figure 3 near here]

Arrows C and D show internal lending: Arrows C1, C2, and C3 show lending by a parent company to its subsidiaries; D shows lending between subsidiaries. The unconsolidated balance sheet, which pertains only to the parent company, directly reports the sum (A+C), i.e., the parent's external plus its internal lending: A+C = 2 + (10+4+6) =22. Note that the transactions between its subsidiaries do not appear on the parent's balance sheet. They would appear on the balance sheets of these separately-incorporated subsidiary companies, but the great majority of subsidiaries are not listed or required to publicly disclose their financials.

In addition, a Japanese business group is required to report amounts of "material" transactions between the parent and its subsidiaries in footnotes but not in financial statements *per se*. Material transactions refer to important-enough-amounts of internal sales, purchases, accounts payable, accounts receivable, dividends paid or received, as well as loans made and loans received.

When footnotes provide the total amount of a parent's internal lending, the sum  $C_1+C_2+C_3$  in Figure 3, we can calculate the amount that a parent has lent externally, A, by subtracting that sum from the sum of A+C. In Figure 3, then, external lending by the parent equaled 2 units. Further, subtracting the amount of the parent's external lending, A, from the group's external lending, A+B, produces the aggregate amount of external lending by all of a parent's subsidiaries. To demonstrate how we calculated components of a business group's lending, we used data as of the end of its 2008 fiscal year (FY2008) on March 31, 2009 for Nissan. See Appendix B1.

#### 3. Internal and External Lending: Methods and Rationales

This section describes some of the methods and rationales for companies' making internal and external loans to other companies. They are more formally modeled in the Appendix. The next section then lays outs empirical hypotheses implied here, as well as some additional hypotheses.

Financing of companies with internally-delineated business units, or as they are more often called "multi-segment companies," have long attracted analysis. Several hypotheses about the costs and the benefits of companies' specializing or agglomerating have been advanced over the past few decades. Statistical evidence has often been suggestively supportive, if less often been conclusive. Although companies with subsidiaries differ from companies with only business units, the principle issues and answers are likely to be quite similar. Details differ, and so will some implications, but they often will be of secondary importance.

What is of primary importance here, however, is that we have been able to recover the amounts of internal loans that parents made to subsidiaries. So far, we do not see or foresee the data becoming available for U.S. companies that would make it feasible to accurately estimate parent loans made to their subsidiaries or any "loans" made by headquarters to internal business units, either one-by-one or *in toto*.

Apparently, neither models, data, nor practice incorporate business units that issue their own external debt or equity. Models of internal capital markets generally assume that the "headquarters unit" is the only business unit that decides the size and timing of any external issues of debt or equity. An assumption that only headquarters raise funds externally fits companies that have internal divisions that are not legally separate (e.g., Buick and Chevrolet within General Motors).

The standard assumptions would not fit practice at large Japanese companies, where business groups predominate. Subsidiary companies in Japan obtain not only (internal) equity funding from their parents; often, they also obtain loans and trade credit from them. In addition to that (internal) lending, subsidiaries very often raise funds externally on their own, albeit with the approval, and typically under the direction, of

their parent companies.<sup>9</sup> Subsidiaries almost always have bank loans outstanding; some, but many fewer, subsidiary companies have issued bonds in their own names. Further, it is not uncommon for subsidiaries to have obtained funds by having issued their own publicly-traded equity. For simplicity, below we only consider the most-common practice, whereby a parent owns all of its subsidiary companies' equity.

#### 3.1 Why do parents have subsidiary companies and make loans to them?

Multi-segment companies perforce allocate funds across business units whenever they make choices about operating or capital budgets. These allocations are akin to equity investments. Although not reported publicly, headquarters may make an investment of, say, \$125 million in machinery. Companies with consolidated subsidiaries, or business groups, are likely to make decisions and arrangements about allocating funds with subsidiaries that are more formal. For example, parents record their equity investments in their subsidiaries in their financial statements. Purchases and sales of shares of subsidiaries are also recorded legally. Parent companies can also allocate internal funds across their subsidiaries in the form of loans. These loans would be recorded, but then "eliminated", leaving no trace in financial statements, during the process of accounting consolidation.

Why agglomerate? Business groups may be able to borrow more or at lower costs externally due to economies of scale or due to their whole being more diversified than their parts. And, even apart from scale or diversification, parents are likely to be more informed about subsidiaries than banks are. In addition, relative to banks, parents may more quickly and cost-efficiently renegotiate loans or liquidate assets (especially if parents have other, similar businesses).

If headquarters or parents serve the only intake point for external funds, then they acquire and allocate the funds, typically via budgets for business units of companies

<sup>&</sup>lt;sup>9</sup> This is the business-group analogue to the typical assumption in discussions of internal capital markets at individual companies, i.e. that the headquarters unit of an individual company controls allocations of funds across business units, such as divisions, product lines, or locations. Units' operating and capital budgets reflect these internal allocations. The practical effect of transfers of cash into a business unit is that they represent funding via more equity, not more debt, and thus, not internal lending.

that are not part of a business group, or via formal equity or debt transactions for subsidiaries.

In practice, headquarters make equity investments. There seem no insuperable barriers to their having some debt-like funding for business units. However, there is scant evidence, even anecdotal, of much funding by headquarters of business units that resembles loans. Parents, however, face explicit decisions about whether to provide equity or debt financing to their legally-separate subsidiaries. In the case at hand, very many Japanese parents make loans to their corporate children.<sup>10</sup>

We hypothesize that enforced, cash-coupon, debt financing of subsidiaries, and even of business units, could have two of the usual salutary effects asserted for debt. First, paying coupons in cash might have "Jensen effects" on managerial discipline that improved cost efficiencies. Second, effectively allowing managements of units or subsidiaries to lever up by substituting parent-provided debt for parent-provided equity financing might ramp up incentives for management to take risks in a manner similar to stock options for senior management.

#### 3.2 Why do subsidiaries have external loans?

In the case of listed Japanese business groups, the vast majority of subsidiaries have both internal loans and external debt in the form of bank loans (and, rarely, of bonds). Given the significantly asymmetric information between borrowers and lenders, it would not be surprising if subsidiaries as well as their parents faced debt constraints. Such constraints likely vary across subsidiaries within business groups. Constraints at the business-group level likely leave many or all subsidiaries constrained, and perhaps particularly higher-quality subs, which groups might consider better able to borrow from banks directly.

In addition, bank loans provide subsidiaries with objective and credible signals of their solid conditions and prospects. The signals can reverberate into lower external equity costs, into better evaluations of the subsidiaries by the parents, and so on. And,

<sup>&</sup>lt;sup>10</sup> In our sample, there are many fewer cases of subsidiaries making loans to their parents. We don't analyze or estimate their amounts or what factors drive such upstream lending.

parents may want the extra cost discipline and extra income incentive of subs having substituted debt for equity.

In contrast to business units, subsidiaries typically have internal loans from their parents and simultaneously have ongoing external loans from (commercial) banks. Any of a number of (non-exclusive) conditions may lead subsidiary companies to have both internal and external loans. Just as relatively healthier parents may provide more internal loans, healthier subs may get more external (bank) loans. In that way, when parents' conditions are not strong, subsidiaries' getting external loans may boost the total debt available to a business group. The parent or business group may be weaker than one or more of its subsidiaries, for example, if the parent's own performance or prospects have faltered or if other subsidiaries in the business group have similarly faltered.

Another incentive for subsidiaries to get bank loans is to get objective, external validation about subsidiaries' conditions and prospects. Getting a bank loan can be seen as providing both *ex post* and *ex ante* monitoring. That monitoring may raise the objectivity of a parent's evaluation of its sub. A sub that cannot get a loan might spur its parent to analyze why a bank rejected the sub.

Such validation may be especially valuable to the minority, likely-diffuse shareholders of a sub that is not completely owned, but is owned and controlled enough by a parent to be consolidated into the parents' financial statements. (Being a public company would require a subsidiary to report audited financials too.) But, another intriguing possibility is that the external validation and funding might increase a parent's lending to its subsidiary.

Finally, a subsidiary's having either (or both) internal or external debt may strengthen incentives on management to carefully contain costs and analyze and choose investment projects so that shareholder value is increased.

#### 4. Internal and External Lending: Hypotheses

In light of the discussion in the previous section and the associated model in the Appendix A, here we advance several hypotheses about internal and external lending. Our hypotheses relate components of internal and external lending to the conditions of parent companies and of their subsidiary companies. They also relate internal and

external lending to broader factors, such as financial and economic crises. In the next section, we provide more details about our variables and estimated specifications.

#### 4.1 Hypotheses about the effects of crises

One question of particular interest was how much internal and external lending responded to the economic and financial crises that hit Japan since the middle of the 1980s. Because economic and financial crises reduced subsidiaries' more than their parents' access to financing, we hypothesize that crises led to more internal lending (from parents to their subsidiaries).

H1: Parents lend more to their subsidiaries during the crisis period.

#### 4.2 Hypotheses about the effects of ownership, size, and demands for funds

We address whether parents' ownership percentages affected their lending to their subsidiaries is one of the issues. As we discussed, parents often own overwhelming shares of their subsidiaries and might be expected to extend more internal loans. The relative conditions of parents and their subsidiaries also may have affected the volume of internal loans outstanding. To provide evidence of such effects, we included measures both of parents' strength and of subsidiaries' strength. Theoretical and empirical analysis of internal capital markets have suggested that parent companies or business groups that are larger relative to size of subsidiaries provide more internal loans. Either economies of scale in information production or diversification could spur internal lending. In contrast, parents with larger capital expenditures might provide fewer loans to their subsidiaries. Analogously, parents provide could more loans when their subsidiaries have larger capital expenditures. In light of the above discussion, we formulate our hypotheses as follows.

H2-a: Parents lend more to subsidiaries when parents own more of their subsidiaries. H2-b: Parents lend more to smaller subsidiaries.

H2-c: Parents lend less (more) to their subsidiaries when the parents (the subsidiaries) have larger demands for funds.

#### 5. Estimated Specifications

#### 5.1 Baseline specification

To test hypotheses discussed above and to gauge how much internal and external factors affected internal and external lending, we applied specifications of the following form to our panel of year-business group observations:

(1) Lending<sub>i,t</sub> =  $\alpha + \beta \cdot CRISIS + \gamma \cdot Z_{i,t-1} + \mu_i + e_{i,t}$ 

where

(2) 
$$\beta \cdot CRISIS = \beta_1 JABubbleburst$$
  
+  $\beta_2 JABankcrisis$   
+  $\beta_3 TakenakaPlan$   
+  $\beta_4 GFC$   
+  $\beta_5 GEAEarthquake$ 

and

(3) 
$$\gamma \cdot \mathbf{Z}_{i,t-1} = \gamma_1 ParentEqIn_{i,t-1} + \gamma_2 ParentOwn_{i,t-1} + \gamma_3 Subsnumber_{i,t-1}$$
  
+  $\gamma_5 CapexParent_{i,t} + \gamma_6 CapexSubs_{i,t} + \gamma_7 SalesParentSubs_{i,t-1}$   
+  $\gamma_8 SalesParentOut_{i,t-1} + \gamma_9 SalesSubsInt_{i,t-1} + \gamma_{10} SalesSubsOut_{i,t-1}$   
+  $\gamma_{11} GroupSize_{i,t-1} + \gamma_{12} Trend$ 

We estimated equation (1) for each of five lending variables, *Lending<sub>i,t</sub>*: *GroupLendAll*, *ParentLendAll*, *ParentLendSubs*, *ParentLendOut*, and *SubsLendOut*. *GroupLendAll* is external lending by the business group, i.e., consolidated lending. Thus, *ParentLendAll* is the sum of lending by the parent to its subsidiaries (*ParentLendSubs*) and lending by the parent to outside companies group (*ParentLendOut*). *ParentLendSubs* is internal lending by parents to their subsidiaries. *ParentLendOut* and *SubsLendOut* are external lending by parents and by subsidiaries to outside companies, respectively.

All of the regression variables that were based on financial statement items were scaled by each parent's unconsolidated total assets as of the end of the prior fiscal year. Thus, each of the five lending variables, as well as the capital expenditure and sales variables were scaled this way. The other variables were not affected by the sizes of the companies.

#### 5.2 Dummy variables for economic and financial crises

To test whether internal or external lending was affected by identifiable financial or economic stresses in Japan, we included five dummy variables in *CRISIS*, as shown in equation (2) above:

1.	JABubbleburst	=1 for FY1990 -	- FY1992; 0 otherwise,
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2.	JABankcrisis	=1 for FY1997 –	- FY1999; 0 otherwise,
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- **3.** *TakenakaPlan* =1 for FY2001 FY2003; 0 otherwise,
- 4. GFC =1 for FY2008 FY2009; 0 otherwise, and
- **5.** *GEAEarthquake* =1 for FY2011; 0 otherwise.

The initial conditions and the severities of effects on the Japanese real economy and on banks of the events differed across the events associated with the dummy variables. The first dummy variable covers the period after the bursting of the Japanese "bubble economy," when Japan's economy was more troubled than its banks were. The second dummy variable corresponds to the years when Japanese banks were deeply troubled. After the Japanese "Accounting Big Bang" reform in 2000, the financial revival plan known as "Takenaka Plan" forced banks to write down the values of their nonperforming (sometimes "zombie") loans. The GFC dummy covers the two years that span the "Lehman Shock" and the serious economic downturn that followed it. The Great East Japan Earthquake at the very end of FY2010 adversely affected businesses in FY2011 and to some extent after FY2011.

Before estimating the coefficients for the CRISIS dummy variables, Figure 4 gives some perspective about how lending changed during crises. Figure 4 shows flows for the years just before and just after two major adverse shocks: the bank crisis of late 1990s and the global financial crisis (GFC) that erupted in the late 2000s. Panel A of Figure 5 shows that external borrowing by parent companies and by their subsidiaries

changed very little during the Japanese banking crisis. During that episode, subsidiaries got 60 percent more loans from their parents.

Panel B shows a noticeably different pattern of lending during the GFC. One difference was that Japanese banks were on much more solid ground when the GFC erupted in the United States than they were during the domestic Japanese banking crisis. Consistent with banks' reducing lending more during the banking crisis than during the GFC, Figure 6 shows that banks' attitudes toward business lending dropped more and for longer in the late 1990s than it dropped during the GFC. In contrast to very small increase during the banking crisis, during the GFC parents borrowed about 13 percent more in FY2009 than in FY2007. Parents, in turn, then upped lending to their subsidiaries by 15 percent, from 20 to 23 trillion yen, in the face of a 13 percent reduction in lending to subsidiaries from outside lenders.

## [Figure 4 near here]

#### 5.3 Control variables

Equation (3) shows the list of control variables represented by the vector Z. We were interested in these variables in their own right, as well as for controls for otherwise omitted factors. We included two variables related to how much parents owned their subsidiaries. We were interested both in how important the subsidiaries were to the parent, and vice versa.

*ParentEqIn* is the parent company's investment (or equity holding) in its subsidiaries. Like the other variables that were based on balance sheet items, this investment was scaled. For this variable, however, we expressed investment relative to the parent's unconsolidated equity. Thus, this variable stood for the relative importance of the subsidiaries collectively to their parent. In contrast, *ParentOwn* is the parent's same investment in its subsidiaries, but this time scaled by the sum of the parent's equity investment in its subsidiaries and minority interest. This latter ratio stood for the relative importance of the parent to its subsidiaries. In effect, it measured how much of the subsidiaries the parent owned. *Subsnumber* is the total number of consolidated and non-consolidated subsidiaries. These are proxies for the extent of importance of subsidiaries.

for their parent company. We took the value at the end of prior year (t-1) to control endogenous problem.

*CapexParent* is the parent's own capital expenditures, which we calculated as the sum of the parent's (unconsolidated) depreciation and the first difference of the stock of the parent's (unconsolidated) capital assets. *CapexSubs* is capital expenditures untaken by subsidiaries, which we estimated by the difference between the (consolidated) capital expenditures of the business group and the parent's capital expenditures. As noted above, both capex variables were scaled by the parent's total assets at the end of the prior fiscal year (t-1).

SalesParentSubs is the sales by a parent to its subsidiaries. SalesParentOut is sales by a parent to outside companies, which we calculated as unconsolidated sales minus sales by a parent to its subsidiaries. SalesSubsParent is by subsidiaries to their parent, which equaled purchases by a parent from its subsidiaries. SalesSubsOut is sales by subsidiaries to outside companies. We calculated as consolidated sales minus sales by subsidiaries to outside companies. For each sales variable, we used the prior year's (t-1)sales, which we then scaled by the parent's total assets at the end of that prior fiscal year (t-1).

Although we scaled the financial statement variables, we also included in the vector Z a measure of the overall size of the business group, (the natural log of) consolidated total assets at the end of the prior fiscal year (*t*-1). Finally, the vector Z included a linear trend variable, *Trend*, to control for ongoing developments that we otherwise had not been able to identify and measure.

#### 5.4 Lending Attitudes by Size of Companies

After Table 4 shows estimates of equation (1), Table 7 then shows estimates for the same five lending and same control variables, *Lending* and Z, after we replaced the vector *CRISIS* with two measures of banks' attitudes toward business lending:

(4) Lending<sub>i,t</sub> =  $\alpha + \delta$  • **BANKSATT** +  $\gamma$  • **Z**<sub>i,t-1</sub> +  $\mu_i$  +  $e_{i,t}$ 

where

(5)  $\delta \cdot BANKSATT = \delta_1 BanksAttParent_t + \delta_2 BanksAttSubs_t$ 

**BANKSATT** in equations (4) and (5) contains two measure of banks' lending attitudes. We obtained the net percent of answers "accommodative" bank lending attitudes, calculated as percent of banks' answers "accommodative" minus the percent of their answers "severe" in response to the quarterly TANKAN survey, which was conducted by the Bank of Japan. Banks answered separately for loans to businesses of different sizes. The survey asked about attitudes toward businesses categorized as large (more than 1 billion yen), medium-sized (100 million yen to 1 billion yen), or small (20 million yen to 100 million yen), based on the businesses' equity capital.

We included *BanksAttParent* and *BanksAttSubs* simultaneously. For each yearbusiness group observation, we constructed *BanksAttParent* as the average over the preceding four quarters of the net percent of banks that answered that they had "accommodative" lending attitudes toward companies of the (equity capital) size of the business group's parent company.<sup>11</sup> We calculated *BanksAttSubs* in the same way, but used net percent "accommodative" answers for companies of the size of the business group's subsidiaries. We calculated the equity of a business group's subsidiaries as the parent's unconsolidated equity investment in its subsidiaries by the percent of the subsidiaries that the parent owned.

Figure 5 plots the quarterly net percent "accommodative" answers for lending to the three sizes of businesses.

## [Figure 5 near here]

Banks' attitudes were most accommodative, or lenient, during the latter 1980s, the years of the "bubble economy." After the bubble burst, the net percent accommodative plummeted from about +40 to nearly -40, the largest swing of the entire period. As the economy recovered during the 1990s, so did lending attitudes, before again plummeting when the bank crisis erupted at the end of the 1990s. Attitudes also became

<sup>&</sup>lt;sup>11</sup> Because the TANKAN attitudes survey began in June 1983, FY1984 (ending March 31, 1985) was the first year for which we could use the TANKAN variable. That determined the starting date for our sample.

somewhat less lenient in the early 2000s when the Takenaka plan forced banks to recognize their loan losses. The resulting reductions in their capital ratios led to tighter bank credit. The global financial crisis, which began outside Japan and outside Japanese banks, was also associated with more stringent bank lending. That tightening stemmed less from the direct effects of the GFC on banks than on the harms that it imposed on banks' commercial borrowers. In contrast, the Great East Asia Earthquake on March 11, 2011 left little imprint on lending attitudes, despite the toll that it took on the Japanese economy.

Table 1 contains the mnemonics, descriptions, and calculations for the variables in equations (1) - (5).

### [Table 1 near here]

#### 5.6 Sample of Listed, Nonfinancial, Japanese Companies

We obtained financial statements for all listed, non-financial companies in Japan for fiscal years 1984–2014 (FY1983–FY2014). We used the standard source for these data, Astra Manager. After we excluded financial companies (i.e., banking, securities, insurance and other financial businesses), our sample had 89,957 year-business group observations.

Notably, about three-fourths of listed nonfinancial companies had at least one subsidiary. When we next restricted our sample of companies to those that filed both consolidated and unconsolidated financial statements, so that our sample consisted of companies that were business groups, in that they had a parent company and at least one (consolidated) subsidiary, our sample contained 67,408 year-business group observations. Each parent, on average, had 20 or more subsidiaries. When we removed from our sample the listed companies that themselves had parents—so that we kept only top-level parents, we were left with 59,980 observations.

After dropping observations that had some missing data and delaying the start of our sample period until FY1984 to accommodate one-year-lagged data, our final sample had 42,792 year-business group observations. On average, each year in our resulting

FY1984 – FY2014 sample had over 1,400 business groups, each with one parent and with an average of about two dozen subsidiaries.

Tables 2 and 3 then show descriptive statistics and correlations of the 28 variables that we used. The statistics in Tables 2 and 3, as well as the estimates shown in Tables 2 - 5 below, were based on data winsorized at the first and the 99th percentile for each variable for each year. The exceptions were that neither the five dummy variables for crises, the two lending attitude variables, nor the linear trend were winsorized.

## [Table 2 near here][Table 3 near here]

#### 6. Results for Internal and External Lending

Tables 4 and 5 show estimates of equations (1) and (4) for each of the five measures of lending for each of the two groups of crisis variables. The estimates were based on a common sample of 42,792 year-business group observations for FY1984 – FY2014. Except for the alternate stress variables, the estimates were based on a common set of (baseline) control variables. Each of the estimated specifications included businessgroup fixed effects. Statistical significance of each coefficient estimate was based on robust standard errors.

#### 6.1 Effects of Crisis

Table 4 shows the estimated effects on the lending variables of the crisis dummies and the baseline controls. Column 1 presents results for consolidated lending by business groups. Columns 2 - 5 show the estimates for unconsolidated and for internal lending.

#### [Table 4 near here]

Their significantly negative estimated coefficients in column 1 imply that *JABubbleburst*, *GFC*, and *GEAEarthquake* reduced consolidated lending. The Takenaka plan, on the other hand, raised it. The bank crisis dummy was insignificant.

Before concluding anything from the estimates in column 1, it helps to review the estimates in the remaining columns. For some cases, the estimates in columns 2-5lead to considerably different evaluations of internal lending than the estimates in column 1 do. Consider the estimated effects after the bursting of the economic bubble. Row 1 of column 1 indicates that consolidated lending significantly declined. The estimates in columns 4 and 5 imply that it was particularly subsidiaries rather than parents who reduced their lending then. More noticeable was the suggestion, if not the significance, in column 3 that parents then lent more to their subsidiaries.

Perhaps more striking were the reactions to the global financial crisis (GFC). The estimates in row 4 shows the cross currents in lending associated with the GFC (apart from the effects that operated through the control variables). Column 1 indicates that consolidated lending declined, but only by 0.06. Columns 4 and 5 indicate that subsidiaries, and especially their parents, cut their lending to outside companies. In contrast, column 2 shows that parents' (unconsolidated) lending actually rose a fair bit.

Column 3 provides the natural explanation for the difference: Parents' lending to their subsidiaries rose quite strongly. Thus, while column 1 showed that consolidated lending declined, column 3 showed that parents boosted their lending considerably to their subsidiaries. And, a similar pattern of differences across borrowers also emerges in row 5, which has the estimated effects of the GEA earthquake.

Taken together, the estimated effects in Table 4 imply that, in the face of crises, parents tended to boost their overall lending. In general, they did so by increasing their lending to their subsidiaries considerably while simultaneously reducing their lending to companies outside their business groups.

#### 6.2 Effects of ownership, subsidiaries' sizes, and demands for funds

Rows 6 and 7 show the estimated effects of the two ownership variables. Row 6 shows that the larger the share of business group's equity that was invested in its subsidiaries, the more that the parent lend to its subsidiaries. That ownership variable had an insignificant effect on parents' lending to outside companies. Consistent with their getting more loans from their parents, more important subsidiaries also provided more

loans to outside companies, though not enough to make consolidated lending clearly higher.

Row 7 shows the effects of the other measure of the importance of parents' ownership of subsidiaries, *ParentOwn*<sub>*t*-1</sub>, which measured how much of their subsidiaries parents owned. Again, as shown in column 3, parents lent more when they owned larger percentages of their subsidiaries. This result recalls debt overhang, though in mirror image: The more that lending to subsidiaries would benefit the other equity holdings, the less debt in the form of loans to their subsidiaries that parents would provide. Lending was larger when parents wholly owned their subsidiaries. In that regard, then, these results might be regarded as evidence of "equity overhang." The reasons for higher ownership shares being associated with parents' lending more and subsidiaries lending less to outside companies is not apparent.

In contrast to the variables that measure the relative importance of parents and subsidiaries to each other in rows 6 and 7, rows 8 and 15 show the effects associated with absolute sizes. Row 15 shows the estimated effects of the size of business groups, as measured by consolidated assets, on lending relative to unconsolidated assets. Column 3 shows that parents' lending (as a percent of unconsolidated assets) to their subsidiaries was very significantly lower for larger business groups. Nonetheless, the amounts lent in yen, naturally enough, were larger at larger groups.

Smaller subsidiaries were likely to have access to less credit and less favorable terms than their business groups as a whole or even larger subsidiaries had. Our estimated specifications let us distinguish between the effects associated with group size from the effects associated with the sizes on average of subsidiaries. Having controlled for the overall size of a business group by including consolidated assets in row 15, the variable in row 8 for the total number of subsidiaries serves as a proxy for how small a group's subsidiaries were.

The positive coefficient in column 3 for row 8 implies that parents lent more internally when their subsidiaries were smaller. At the same time, column 4 implies that having smaller subsidiaries led parents to lend less to outside companies, though not enough less to completely offset a net positive effect on parents' unconsolidated lending (column 2). Column 5 shows that, after controlling for group consolidated assets, having

more (and thus smaller) subsidiaries in a group was associated with those subs' lending more to outside companies. We do not have data about the subs' borrowers or customers. Nor do we have data about loans between subsidiaries. It may well be that the small-sizerelated constraints on credit applied to subs' customers just as it did to subsidiaries themselves. That would lead smaller subsidiaries to make more loans to smaller companies for the same reasons that the subs borrowed from their parents.

Capital expenditures and sales may also affect internal and external lending. Capital expenditures (capex) require funds. Thus, we would expect Sales provide funds when they are paid for. Although sales ultimately raise cash flows, sales also typically require funds in advance for production and are not always paid for fully and promptly.

Row 9 of column 3 shows that the estimated effect of parents' outlays for capital expenditures, *CapexParent*, is strongly negative, while row 10 shows that the estimated effect subsidiaries' capex, *CapexSubs* is strongly positive. These results indicate that parents' devoting more of their funds to their own capital expenditures reduced their lending to their subsidiaries. On the other hand, when their subsidiaries had greater outlays for capital, parents then lent them more. The results in rows 9 and 10, however, indicate that is not the entire story. Larger parents' capex showed no sign of reducing their lending to outside companies. And larger capex by subsidiaries tended to raise both parents' and subsidiaries' outside lending by small, though significant, amounts.

#### Table 5 near here

Table 5 then shows whether their parent companies lent more to subsidiaries when commercial banks were less willing to lend. Row 2 of column 3 shows that the coefficient of *BanksAttSubs* is negative and significant. Further, the row 5 shows that the coefficient cross term with *ParentEqIn* is negative and significant. The results indicating that internal lending rose when banks were less willing to lend to subsidiary-sized companies. While we don't address how much parents helped to shift funds across subsidiaries, we do provide estimates of how much financial aid parents provided to their subsidiaries *in toto* when commercial banks were less willing to lend. In that regard, our

results speak to the aggregate effects of internal lending, in contrast to others' estimates of the cross-subsidiary effects.

#### 7. Summary and Implications

We analyzed whether, and in what amounts, loans from one (nonfinancial) company to another have consistently acted as "shock absorbers" when commercial banks reduced their supplies of credit. The key questions were addressed in the paper: do nonfinancial companies do more "shadow lending" when banks reduce their supplies of credit to companies? More specifically, what factors affect how much parents lend to their subsidiary companies?

The findings are summarized as follows. First, we find that internal lending rises during crises after the accounting reform in the 2000s: Parents lend more to their subsidiaries during the Japanese economic crises and when subsidiaries are larger parts of a business group. Second, we find that banks' lending attitudes affected parents' and subsidiaries' loans: Parents' internal lending rises when banks were more willing to lend to them and when banks were less willing to lend to their subsidiaries. Finally, we find that parent-specific and subsidiaries-specific conditions also affect internal lending: More CAPEX by parents reduce their loans to their subsidiaries. In other words, more CAPEX by subsidiaries lead to more loans from their parents.

Although we have not explicitly examined tunneling or control rights in Japanese context, this topic has already been done by previous research by focusing on developing countries that are significantly facing these problems. However, what remains to be done is to consider the possibilities of exploitation by a parent of their subsidiaries, e.g., by absorbing profits from payouts to the parent by their subsidiary companies. We can examine whether parents take advantage of their subsidiaries, or vice versa. This should be our next research topic.

#### **Appendix A. How Much Do Firms Lend Internally?**

#### A1. A Model of Loans within Business Groups

In this appendix, we show the formal model of our empirical analyses. The business group is not typically controlled a family, and is different from keiretsu (keiretsu literally means "a line of affiliation") that historically traces back to *zaibatsu* in the sense that keiretsu are business groups across consolidated firms that are also not family-controlled. They are historically manager-dominated inter-corporate groups. Here, we use the term of business group as a group of firms that belong to the same consolidated firm.

Our model of intrafirm lending builds upon the underlying frameworks in the model of internal capital market of Stein (1997) and of Almeida, et al. (2015). Our model adds debt and debt costs that vary over firms and over time, D and  $r_D$ .<sup>12</sup> P denotes the parent company and S denotes the subsidiaries in a business group, G. For simplicity, we omit subscripts for individual firms.

The consolidated assets of business groups are larger than those of the (unconsolidated) parent company and larger than those of the groups' subsidiaries. Here, we assume that parents have more assets than their subs:

(A1)  $A_G > A_P \ge A_S$ 

Business groups, parents, and subs are each financed with equity, E, and with debt, D, which may include loans and bonds:

 $(A2) \qquad A = E + D$ 

Each firm produces output, f(A), where A is the firm's stock of productive assets, such as property, plant, and equipment. Each firm maximizes (expected) profit by choosing D, given its equity E:

(A3) 
$$\max_{D} \Pi \equiv \theta(1+k)f(A) - r_{D}D$$
  
s.t.  $D \le hA$ 

where  $\theta > 0$  is a firm-specific productivity indicator and *k* is a common productivity indicator. *hA* is the maximum amount that a firm can borrow given its assets, *A*. The

<sup>&</sup>lt;sup>12</sup> For clarity, we suppress subscripts that would denote time periods.

"haircut",  $0 \le h \le 1$ , reflects that, for many reasons, firms are unlikely to be able to borrow as much as the total value of their assets. If the borrowing constraint is binding, then parents' providing/lending/etc. funds to their subs might be valuable.

#### A2. Why Form Business Groups and Borrow from Parents?

Business groups or families have advantages in debt markets over their own parent companies and the parents' subsidiaries in debt markets. Two important advantages are the business groups' larger sizes and greater diversification than their parent and subsidiary firms. A family need not always be less risky than its parent or its individual subsidiaries. To capture the economies of scale in information and production costs of debt, as well as the risk reductions from families being more diversified than their parents and subs, we take the (risk-adjusted) productivity of a family to be larger than that of its parent company and of is subs:

### **Assumption 1:** $\theta_P > \theta_S$

And, in turn, we take the costs of debt to reflect those cost and diversification benefits:

**Assumption 2:**  $r_{DG} < r_{DP} \le r_{DS} = r_{DB}$ 

where  $r_{DG}$  is the cost of debts under conforming a business group, which is the lowest compared with the cost of debts of a standalone parent  $r_{DP}$ . Here, we define the gap of debt cost between a parent and its sub is  $\Delta r^{D} \equiv r_{DS} - r_{DG}$ . This reflects reduced monitoring costs due to lower asymmetric information: Stein (1997), etc. The cost of debts of subs  $r_{DS}$  is not less than the parent cost of debt  $r_{DP}$ , which we presume that standalone subs can only borrow from a bank loans  $r_{DB}$ .

#### A2.1. Standalone Companies

To begin, we consider firms without families. Absent its debt constraint, equation (A3) gives the first-order condition for a firm given by (A4):

(A4) 
$$f'(D) = \frac{1+r_D}{\theta(1+k)}$$

Equation (A4) implies the optimal, unconstrained value of D, denoted  $D^{FB}$ . According to equation (A4),  $D^{FB}$  falls as  $r_D$  rises. Equation (A4) also implies that DFB falls as k or  $\theta$  declines. If D is constrained by borrowing limit hA, then it falls short of DFB.

#### A2.2. Business groups

We consider a business group that consists of a parent company, P, and subsidiaries, S. Assuming that parents, in turn, provide funds at cost  $r_{DG}$  to their subsidiaries, the parent and the sub each pay, and thus optimize debt and asset size based on, the lower-per-unit, family cost,  $r_{DG}$ , on the debt used to fund both the parent and the subsidiary:

(A5) 
$$\max_{D_i} \prod_i^G = \theta_i (1+k) f(A_i) - r_{DG} D_i \qquad \text{for} \quad i = P, S$$

That is, the cost of debt is the same for both the parent and its subs as it is for the entire business group.  $A_i$  is defined as  $A_i = E + D_i$ . For simplicity, we treat E as constant below. For a parent company, we assume that the following assumption holds:

Assumption 3 (Parent financial no constraint):  $D_P^{FB} = \min(D_P^{FB}, hA_P) = D_P^{FB}$ 

That is, there is no binding of financial constraints for a parent company.

On the contrary, we define the cap of potential transfer T from P to Subs:

## Assumption 4 (Cap of transfer to subsidiaries): $T = hA_P - D_P^{FB} > 0$

Since the group's debt cost is lower than the debt cost for either the parent or the subs, the group borrows enough for lending to their subs. We assume that parent borrows via loans and bonds on behalf of consolidated firm. Thus, parent can lend to subs.

To consider the cost and benefits of forming a business group such as a conglomerate, we explicitly consider the ownership relation between a parent and its subs. The parameter  $\alpha(\underline{\alpha} \le \alpha \le 1)$  reflects the agency costs between them, which is a factor that reduces the profits of subsidiaries because of some conflicts between them such as small incentives of subs' manager for making efforts for the entire business group.

(A6) 
$$\Pi_{S}^{\alpha} = \alpha \theta_{S} (1+k) f(A_{S}^{\alpha}) - r_{DS} D_{S}^{\alpha}$$

Another interpretation is that subs are forced by their parent to sell their products to parent company at discounted prices. This generally reduce subs' revenues and thus lower their profits. We also add two additional assumptions as follows:

## Assumption 5 (No constraint from parent loans): $D_S^{\alpha=1} < T$

The simplifying Assumption 5 is relaxed later.

Assumption 6 (No negligible agency costs):  $T < \prod_{S}^{\alpha=1} - \prod_{S}^{\alpha=\underline{\alpha}}$ 

The maximum amounts of loans from parent to its subs (i.e., Transfer from the parent to children) are smaller than the maximum agency costs of forming a business group. Based on these assumptions, we define the profits of the subs that have partially owned by a parent as follows:

(A7) 
$$\Pi_{S}^{G}(\alpha) = \alpha \theta_{S} (1+k) f(A_{S}^{\alpha}) - r_{DG} D_{S}^{\alpha}$$

where the second term reflects the borrowing from the parent and thus the cost of debt is at  $r_{DG} < r_{DS}$ . Note that the subs' total amounts of borrowing come only from their parent because of assumption 5 at this point.

Under the above setting, the maximization problem as a business group is as follows:

(A8) 
$$\max_{\{D_P, D_S^{\alpha}\}} \Pi_P^G + \alpha \Pi_S^G(\alpha)$$
$$st. D_P + D_S^{\alpha} < h \left( A_P + A_S^{\alpha} \right)$$

Note that all of the profit of subsidiaries are included in the same group as a consolidated firm regardless of ownership ratio by their parent company<sup>13</sup>.

**Result 1** There is a threshold  $\alpha^*$  where the total profits for subs by forming a business

group are higher for all  $\alpha > \alpha^*$ .

This result rationalizes for forming a business group from the view of subs by taking advantage of benefits of debt cost reduction by borrowing from a parent, not from banks. If the relationship of  $\alpha < \alpha^*$  holds, then the profit from sub's businesses as a standing alone company is higher than that of the case of forming a business group. One interpretation of small  $\alpha$  might indicate that a parent has only a small portion of equity stakes in its subs, and thus their subs do not make efforts for their entire business group<sup>14</sup>. On the contrary, if a parent has enough equity stakes and control of its subs for the entire business group, then the forming a business group is beneficial even if we explicitly consider agency costs between a parent and its subs.

<sup>&</sup>lt;sup>13</sup> Note that it is not true that we ignore the fact of partial ownership by a parent. We consider the effect of partial ownership as agency problems between a parent and its subs. We explicitly include this agency costs in the part of revenue reduction of subs in equation (A8).
<sup>14</sup> Another interpretation is that subs are forced to sell their products to their parent at discounted

<sup>&</sup>lt;sup>14</sup> Another interpretation is that subs are forced to sell their products to their parent at discounted prices. This reduce subs' revenues and thus lower their profits.

Overall, if this interpretation is plausible, then having enough ownership for subs by its parent is advantageous for a business group, and thus there is an economic rationality for forming a 100% ownership of subs by their parent from social welfare viewpoints.

#### A3. Why do subs also borrow externally?

One simple explanation is that the loan demands by subs are greater than the cap of parent loans. This violates the assumption 5. That is,

### **Assumption 5':** $D_{\overline{S}}^{\alpha} > T$

The cap of parent lending is smaller than the amounts of funds that children want. In this case, children cannot fully borrow from the parent, and thus borrow partially from banks.

To explain why subs still borrow form external loans such as bank borrowing even if the assumption 5 still holds, we extend our basic set up to include the benefits of using external loans. Here we include the parameter of benefits of reduction of agency costs (between subs manager and their parent as shareholders) by outside monitor such as a bank by  $\beta$  (Cline et al., 2014).

Now, the maximization problem of external loans for subs (the second term of (A8)) is defined as follows:

(A9) 
$$\max_{D_{BS}} \prod_{S}^{G} \equiv \alpha \theta (1+k) f(A_{S}) - r_{DG} D_{S} - r_{DB} D_{BS} + \beta D_{BS}$$
$$st. E + D_{S} + D_{BS} = A_{S}$$

The last two terms reflect the cost and benefit from external loans such as bank loans. The first order condition of (A9)is as follows:

(A10) 
$$\frac{d\Pi_S^G}{dD_{BS}} = \alpha \theta (1+k) f'(A_S) + \beta - \Delta r^D$$

If the bank benefit parameter  $\beta$  is low enough, then subs might borrow all the money from their parent as much as possible (i.e.,  $D_{BS}^* = 0$ ). On the contrary, if the condition of  $\beta$  is high enough (e.g.,  $\beta > \Delta r^D$ ), then there might be some rationality for subs to borrow externally (i.e.,  $D_{BS}^* > 0$ ). Qualitatively speaking, we expect that the more benefits from the reduction of agency costs by outside monitoring by banks and/or the more differences between a bank interest rate and a parent interest rate, the more internal lending is.

#### Appendix B. Example of Calculating Internal and External Lending

#### **B1.** Example of internal and external lending by Nissan

To demonstrate how we calculated components of a business group's lending, we used data as of the end of its 2008 fiscal year (FY2008) on March 31, 2009 for Nissan. Figure A1 shows that Nissan's parent did vastly more internal than external lending.

## [Figure A1 near here]

We calculated the lending amounts in Figure 4 as follows. Its consolidated balance sheet reported that the Nissan business group was owed 23.0 billion yen for loans it had made externally. Its (unconsolidated) balance sheet for the parent company of the Nissan business group reported that it was owed 711.0 billion yen on loans it had made to other companies. Footnotes to the unconsolidated balance sheet reported that internal lending, i.e. by the parent to its subsidiaries totaled 710.4 billion yen. That implied that the parent had lent less than 1 (more precisely, 0.6 = 711.0 - 710.4) billion yen externally. Since only 0.6 billion yen of the 23.0 billion yen of the business group's consolidated lending made by the parent to companies outside Nissan's business group, the remaining 22.4 (=23.0-0.4) billion yen were lent by Nissan's subsidiaries to companies outside the Nissan business group. Thus, while the subsidiaries made the great majority of external loans, the parent made loans almost exclusively to its own subsidiaries.

#### **B2.** Example of internal lending by Daifuku

Here is a concrete example of a Japanese parent company's making a loan to one of its subsidiaries.

During its fiscal year 2007, which ended on March 31, 2008, Daifuku Corporation, Ltd. reported consolidated sales of 231 billion yen. Daifuku was the parent company of Contec Corporation, Ltd. Contec seems to have been the largest of Daifuku's 49 consolidated subsidiaries. (In our sample of companies, parents averaged about 24 subsidiaries each.) Daifuku and Contec were listed on the first and sections, respectively,

of the Tokyo Stock Exchange (TSE). Unlike unlisted companies, Contec was required to disclose its financial statements and report material obligations that it incurred, such as additional loans. In Contec's public disclosures, we found information about one of its loans.

In May 2009, after its FY2008 had ended on March 31, 2009, Contec filed a debt disclosure document with the TSE to report that it recently received a loan from its parent, Daifuku. Contec stated that it intended to use the proceeds of that loan for working capital.

It is easy to understand why Contec might have needed more loans during FY2008 and afterward. The adversities unleashed by the global financial crisis were in full swing in Japan during the Spring of 2009, about two quarters after the Lehman shock. Like the U.S., Japan then was in a national recession. International trade had slumped dramatically. Contec's sales for its FY2008 fell to 16.2 billion yen, a full 25 percent lower than they were during FY2007 (21.6 billion yen).<sup>15</sup> Over FY2008, Contec's cash holdings declined by more than 20 percent, from 2.8 to 2.2 billion yen. The cash drain resulted in part, despite its huge sales decline, from the increase in (net) trade credit (i.e., accounts receivable minus accounts payable) it extended: By the end of FY2008, Contec's trade credit had risen by half, from 400 million yen to 600 million yen. Over the year ending March 31, 2009, Contec added 600 million yen of short-term (defined to have original maturities of less than one year) loans to the 3.4 billion yen of total loans that it owed as of March 31, 2008. We cannot determine who those creditors were.

In May 2009, Contec's parent, Daifuku, loaned one billion yen to Contec. Presumably so that it would be recorded as a short-term, rather than a long-term, loan, the original maturity of the loan was for one day shy of a one full year: The origination date of the loan was May 25, 2009; its maturity date was May 24, 2010. This was a large loan for Contec: One billion yen was about six percent of Contec's sales during all of FY2008, boosted its loans owned by about 30 percent and its total liabilities by about 14 percent.

<sup>&</sup>lt;sup>15</sup> The yen averaged about 98 per US\$1.00 during March 2009.

#### **B3.** How large and volatile is internal lending?

Tables A1 and A2 permit us to compare the average size and the volatility of internal and external lending with other balance sheet items, including accounts payable and receivable. The means in Table A1 show average funding sources. The volatilities in Table A2 show how much the sources of funding changed from year to year. Taken together, these Tables show which funding sources were disproportionately volatile.

## [Table A1 near here][Table A2 near here]

Table A1 shows annual averages over FY1984 – FY2014 in trillions of yen. Though not as dramatic as the Nissan example above, rows 3 and 4 show that, for our sample of companies and years, parents made more loans to their subsidiaries (11.9) than to outside companies (3.3). Row 12 of column 2 shows that subsidiaries, in turn, also made small average amounts of loans to their parents: The 1.0 trillion yen was less than one tenth of the amounts that parents lent on average to their subsidiaries.

Parents also extended considerably more loans than trade credit to their subsidiaries. While subs owed their parents 10.2 trillion yen (row 7 of the second column), parents owed their subs 7.5 trillion (row 16), leaving only 2.7 trillion of (net) trade credit from parents to their subsidiary companies.

Row 14 of column 3 shows that subsidiaries' outside borrowing (49.8 trillion yen) was nearly as much as their parents' outside borrowing (53.7 trillion yen in row 11). Thus, while their internal borrowing was considerable, on average subsidiaries funded themselves much more by external borrowing.

As we would expect, subsidiaries did not importantly rely on issuing bonds. Row 19 of column 2 shows that parents had bonds outstanding that averaged 17 percent of their total liabilities. Subsidiaries apparently issued relatively few bonds. In fact, the 28.5 trillion in row 19 of column 1 suggests that subsidiaries owned more of their parent companies' bonds than the subsidiaries themselves had outstanding.

Table A2 shows how much various balance sheet items fluctuated from year to year. Table A2 shows the averages (across all the year-business group observation in our

sample) of the absolute values of the first-differences of each item's ratio to the parent companies' (unconsolidated) assets. Thus, the volatilities can be compared across items. Table A2, however, does not indicate how the changes in an item either accentuated or offset some other changes in balance sheets.

Row 3 shows that parents' loans to their subs were much more volatile (1.0 percent of parents' assets, on average) than parents' or subs' loans to outside companies. These internal loans were also more volatile than trade credit from parents to subs. Row 14 shows that volatility of subsidiaries' external borrowing was 0.7 percent of parents' assets, which was lower than for internal borrowing, despite Table 1's showing that average external borrowing was four times as large as internal borrowing. This hints that the marginal source of funds for subsidiaries, despite their large external borrowing, was internal lending.





- A: Loans from the parent company to outside companies
- B: Loans from subsidiaries to outside companies
- ----> C: Loans from the parent company to its subsidiaries

Notes: The arrows show loans outstanding (in billions of yen) as of March 31, 2009 from the parent company and its subsidiaries in the Nissan business group to companies outside the business group and from the parent to its subsidiaries. The unconsolidated balance sheet reports, as one item of its assets, the sum A+C = 711.0, consisting of the loans that the parent company made to outside companies (A=0.6) plus the loans that it made to its subsidiaries (C=710.4). The business group's consolidated balance sheet reports as assets A+B = 23.0, consisting of the sum of the loans that the parent and its subsidiaries made to outside companies.

	Business		Subsid-
	Group	Parents	iaries
	(1)	(2)	(3)
1. Total assets	367.8	265.4	
		15.0	
2. Loans	4.4	15.2	
3. Loans made by parent to subsidiaries		11.9	
4. Loans made by parent to outside companies		3.3	
5. Loans made by subsidiaries to outside companies			1.1
6. Receivables	64.4	47.1	
7. Receivables owed by subsidiaries to parent		10.2	
8. Receivables owed by outside companies to parent		36.9	
9. Receivables owed by outside companies to subsidiaries			27.5
10. Total liabilities	246.3	166.9	
11. Borrowings	93.5	53.7	
12. Borrowings by parent from subsidiaries		1.0	
13. Borrowings by parent from outside companies		52.7	
14 Borrowings by subsidiaries from outside companies			40.8
15 Pavables	47 9	36.2	
16 Payables owed by parent to subsidiaries	.,.,	75	
17 Payables owed by parent to outside companies		28.7	
18 Pavables owed by subsidiaries to outside companies		20.7	19.2
19. Bonds	28.5	29.2	17.2
20. Total equity	121.5	98.5	
21 (Net) Trade credit	16.5	10.9	
22 (Net) Trade credit from parent to subsidiaries	10.0	27	
<ul> <li>(Net) Trade credit from parent to substantios</li> <li>(Net) Trade credit from parent to outside companies</li> </ul>		8 2	
24 (Net) Trade credit from subsidiaries to outside companies		0.2	83
21. (1997) Frade ereant from substanties to outside companies			0.5

## Table A1. Amounts of Balance Sheet Items

Notes: The data are the end-of-fiscal-year amounts, in trillions of yen, averaged over FY1984 - FY2014. The FY1984-2014 sample averaged 1,380 business groups and 32,720 consolidated subsidiary companies per year.

		Business Group (1)	Parents (2)	Subsid- iaries (3)
1. Vo	platility of total assets	8.9	7.3	
2. 3.	Volatility of loans Volatility of loans made by parent to subsidiaries	0.3	1.2 1.0	
4. 5.	Volatility of loans made by parent to outside companies Volatility of loans made by subsidiaries to outside companies		0.4	0.4
6. 7. 8.	Volatility of receivables Volatility of receivables owed by subsidiaries to parent Volatility of receivables owed by outside companies to parent	3.0	2.7 0.7 2.5	
9.	Volatility of receivables owed by outside companies to subsidiaries			1.3
10. V	Volatility of total liabilities	6.8	5.6	
11. 12. 13.	Volatility of borrowings Volatility of borrowings by parent from subsidiaries Volatility of borrowings by parent from outside	4.0	3.4 0.1 3.4	
14.	companies Volatility of borrowings by subsidiaries from outside companies			1.6
15. 16. 17.	Volatility of payables Volatility of payables owed by parent to subsidiaries Volatility of payables owed by parent to outside companies	2.4	2.1 0.5 1.9	
18.	Volatility of payables owed by subsidiaries to outside companies			1.0
19.	Volatility of bonds	2.4	2.4	
20. V	Volatility of total equity	4.1	3.5	
21. 22. 23.	Volatility of (net) Trade credit Volatility of (net) Trade credit from parent to subsidiaries Volatility of (net) Trade credit from parent to outside companies	2.2	2.0 0.9 2.1	
24.	Volatility of (net) Trade credit from subsidiaries to outside companies			1.2

## Table A2. Volatilities of Balance Sheet Items

Notes: The data are the end-of-fiscal-year amounts, in trillions of yen, averaged over FY1984 - FY2014. The FY1984-2014 sample averaged 1,380 business groups and 32,720 consolidated subsidiary companies per year.

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Notes: This Figure shows aggregate loans outstanding, as a percent of parent companies' (i.e., unconsolidated) assets, for FY1984 - FY2014 for listed, nonfinancial Japanese companies that had consolidated and unconsolidated data and that reported internal transactions in footnotes to unconsolidated financial statements. Panel A shows external lending by parents and their subsidiaries. Panel B shows the sum of parents' internal (i.e., to their subsidiaries) and parents' external (i.e., to outside companies) lending.



Figure 2. Internal and External Lending by Parents and by Their Subsidiaries

Notes: This Figure shows aggregate lending, as a percent of parent companies' (i.e., unconsolidated) assets for FY1984-2014 for listed, nonfinancial Japanese companies that had consolidated and unconsolidated data and that reported internal transactions in footnotes to unconsolidated financial statements. Panel A shows internal lending by parents to their subsidiaries. Panels B and C show external lending by parents and by subsidiaries.

Figure 3. Internal and External Lending by a Parent and by Its Subsidiaries



- A: Loans from the parent company to outside companies
- B: Loans from subsidiaries to outside companies
- ----> C: Loans from the parent company to its subsidiaries
- ----> D: Loans between subsidiaries
- ----> E: Loans from subsidiaries to the parent company

Notes: The arrows show examples of loans outstanding to and from a parent company, to and from its subsidiaries, and to companies outside the business group, which is delineated by the box. The unconsolidated balance sheet reports as assets A+C = 22, consisting of the loans that the parent company made to outside companies (A=2) plus the loans that it made to its subsidiaries ( $C_1 + C_2 + C_3 = 20$ ). The business group's consolidated balance sheet reports as assets A+B = 5, consisting of the sum of the loans that the parent and its subsidiaries made to outside companies ( $B_1 + B_2 + B_3 = 3$ ). Loans made between subsidiaries are shown as  $D_1$  and  $D_2$ . Loans that the subsidiaries made to parent company are shown by  $E_2$ . Data for amounts D and E do not appear in consolidated balance sheets or their footnotes.

### Figure 4. Lending by Parents to Their Subsidiaries During the Japanese Banking Crisis and During the Global Financial Crisis



Notes: Loans outstanding in trillions of yen. Panel A contains data for the same 1,480 business groups for both FY1996 and FY1999. Panel B contains data for the same 1,598 business groups for both FY2007 and FY2009.



Figure 5. Banks' Lending Attitudes toward Large, Medium, and Small Businesses

Notes: This Figure shows quarterly data for 1984Q1 – 2014Q4 for the net percent of commercial banks that reported accommodative attitudes toward business lending in the TANKAN quarterly survey. For each of three sizes of businesses, the net percent was calculated as the percent of banks that reported "accommodative" minus the percent of banks that reported "severe" attitudes. Businesses were categorized as being large (more than 1 billion yen of book equity), medium-sized (100 million yen to 1 billion yen), or small (20 million yen to 100 million yen). Source: Bank of Japan.

	Mnemonics	Descriptions	Calculations
Par	nel A. Loans and	trade credit	
1.	GroupLendAll	Total lending by the business group to outside companies	consolidated lending / $A^{UN}_{t-1}$
2.	ParentLendAll	Total lending by the parent to its subsidiaries and outside companies	unconsolidated lending / $A^{UN}_{t-1}$
3.	ParentLendSubs	Total lending by the parent to its subsidiaries	lending by the parent to subsidiaries / $A^{UN}_{t-1}$
4.	ParentLendOut	Total lending by the parent to outside companies	(unconsolidated lending – lending by the parent to subsidiaries) / $A^{UN}_{t-1}$
5.	SubsLendOut	Total lending by subsidiaries to outside companies	(consolidated lending – (unconsolidated lending – lending by the parent to subsidiaries)) / one-year-lagged consolidated total assets)

Notes: A<sup>UN</sup><sub>t-1</sub> in the denominators refers to the one-year-lagged value of a business group's unconsolidated (i.e., the parent's) total assets. Ratios in Panel A were multiplied by 100 to convert them percentage points.

Table 1.	Variables'	Mnemonics,	Descriptions,	and Calculations	(continued)

	Mnemonics	Descriptions	Calculations								
Panel B. Crisis variables											
6.	JABubbleburst	Aftermath of "bubble economy"	= 1 for FY1990 - FY1992; = 0 otherwise								
7.	JABankcrisis	Japanese banking crisis	= 1 for FY1997 - FY1999; = 0 otherwise								
8.	TakenakaPlan	Regulators forced banks to write-off non-performing loans	= 1 for FY2001 – FY2003; = 0 otherwise								
9.	GFC	Global financial crisis	= 1 for FY2008 – FY2009; = 0 otherwise								
10.	GEAEarthquake	Great East Japan earthquake	= 1 for FY2011; =0 otherwise								

## Panel C. Bank attitude toward business lending variables

11.	BanksAttParent	Banks' lending attitudes toward companies of the parent's size	Net percent of banks reporting "accommodative" lending attitude toward companies of the same size as parent companies, as measured by equity capital
12.	BanksAttSubs	Banks' lending attitudes toward companies of the subsidiaries' size	Net percent of banks reporting "accommodative" lending attitude toward companies of the same size as subsidiary companies, as measured by equity capital

Notes:  $A^{UN}_{t-1}$  in the denominators refers to the one-year-lagged value of a business group's unconsolidated (i.e., the parent's) total assets. Ratios in Panel A were multiplied by 100 to convert them percentage points.

	Mnemonics	Descriptions	Calculations
Pane	el D. Parent and s	ubsidiary specific variables	
13.	ParentEqIn	Equity investment by the parent in its consolidated and non-consolidated subsidiaries	unconsolidated investment in consolidated and non-consolidated subsidiaries / unconsolidated equity
14.	ParentOwn	Parent's ownership share of its consolidated and non-consolidated subsidiaries	unconsolidated investment in consolidated and non-consolidated subsidiaries / (unconsolidated investment in consolidated and non-consolidated subsidiaries + minority interest)
15.	SubsNumber	Total number of subsidiaries	Sum of the numbers of consolidated and non-consolidated subsidiaries
16.	CapexParent	Capital expenditures by the parent	(first difference of unconsolidated capital assets) + unconsolidated depreciation) / $A^{UN}_{\ t\text{-}1}$
17.	CapexSubs	Capital expenditures by the subsidiaries	(first difference of consolidated capital assets) + consolidated depreciation) – ((first difference of unconsolidated capital assets) + unconsolidated depreciation) / $A^{UN}_{t=1}$
18.	SalesParentSubs	Sales by the parent to its subsidiaries	sales by the parent to its subsidiaries / one-year-lagged unconsolidated total assets
19.	SalesParentOut	Sales by the parent to outside companies	(unconsolidated sales – sales by the parent to its subsidiaries) / $A^{UN}_{\ \ t-1}$
20.	SalesSubsParent	Sales by subsidiaries to their parent	purchases by the parent from its subsidiaries / $A^{UN}_{t-1}$
21.	SalesSubsOut	Sales by subsidiaries to outside companies	(consolidated sales – (unconsolidated sales – sales by parent company to subsidiaries) / $A^{UN}_{\ t-1}$
22.	GroupSize	Size of the business group	Natural log of consolidated total assets
23.	Trend	Linear trend	Linear trend

## Table 1. Variables' Mnemonics, Descriptions, and Calculations (continued)

Notes:  $A^{UN}_{t-1}$  in the denominators refers to the one-year-lagged value of a business group's unconsolidated (i.e., the parent's) total assets. Ratios in Panel A were multiplied by 100 to convert them percentage points.

		mean	sd	min	p10	p50	p90	max
1.	GroupLendAll	0.91	2.16	0.00	0.00	0.17	2.24	15.19
2.	ParentLendAll	4.48	6.69	0.01	0.14	2.15	11.25	49.75
3.	ParentLendSubs	3.47	5.70	0.00	0.00	1.36	9.29	38.09
4.	ParentLendOut	0.91	2.32	0.00	0.00	0.15	2.25	19.23
5.	SubsLendOut	0.30	1.01	0.00	0.00	0.00	0.65	7.65
6.	JABubbleburst	0.07	0.25	0.00	0.00	0.00	0.00	1.00
7.	JABankcrisis	0.12	0.32	0.00	0.00	0.00	1.00	1.00
8.	TakenakaPlan	0.12	0.33	0.00	0.00	0.00	1.00	1.00
9.	GFC	0.08	0.28	0.00	0.00	0.00	0.00	1.00
10.	GEAEarthquake	0.04	0.20	0.00	0.00	0.00	0.00	1.00
11.	BanksAttParent	0.14	0.15	-0.23	-0.05	0.16	0.33	0.46
12.	BanksAttSubs	0.08	0.13	-0.19	-0.06	0.07	0.25	0.38
13.	ParentEqIn	15.04	21.19	0.04	0.79	7.02	39.43	100.00
14.	ParentOwn	85.06	20.58	16.53	53.81	94.83	100.00	100.00
15.	SubsNumber	19.96	38.84	1.00	2.00	8.00	43.00	258.00
16.	CapexParent	3.30	4.35	-7.45	0.09	2.21	8.14	26.16
17.	CapeSubsx	1.71	3.75	-6.73	-0.22	0.52	5.27	23.99
18.	SalesParentSubs	13.25	22.45	0.00	0.00	3.08	39.55	133.01
19.	SalesParentOut	94.36	60.97	0.00	32.84	81.11	172.46	346.02
20.	SalesSubsParent	39.80	48.68	0.00	2.46	23.67	96.16	368.43
21.	SalesSubsOut	5.33	13.31	0.00	0.00	0.00	17.69	76.47
22.	GroupSize	11.01	1.48	7.52	9.28	10.83	13.07	15.25
23.	Trend	18	8	1	7	19	29	31

 Table 2.
 Sample Descriptive Statistics

Notes: This Table shows the means, standard deviations (sd), minimums (min), maximums (max), medians (p50), and the lower and upper ten percent quantiles (p10 and p90) for variables described in Table 1. The descriptive statistics were calculated from data for 42,792 business group-year observations of end-of-fiscal year values for FY1984 – FY2014 for listed, nonfinancial, Japanese business groups. Subscripts t refer to the current fiscal year; subscripts t-1 refer to the prior fiscal year. For descriptions and calculations of variables, see Table 1.

#### Table 3. Sample Correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1.	GroupLendAll																						
2.	ParentLendAll	0.41																					
3.	ParentLendSubs	0.18	0.90																				
4.	ParentLendOut	0.62	0.41	0.01																			
5.	SubsLendOut	0.66	0.25	0.26	0.07																		
6.	JABubbleburst	0.00	-0.02	-0.03	0.04	-0.02																	
7.	JABankcrisis	0.01	-0.03	-0.03	0.00	0.01	-0.10																
8.	TakenakaPlan	0.04	0.00	0.01	-0.03	0.06	-0.10	-0.14															
9.	GFC	-0.03	0.03	0.05	-0.05	-0.01	-0.08	-0.11	-0.11														
10.	GEAEarthquake	-0.03	0.01	0.03	-0.04	-0.01	-0.06	-0.08	-0.08	-0.06													
11.	BanksAttParent	0.00	-0.01	-0.03	0.05	-0.03	-0.46	-0.33	-0.13	-0.27	0.01												
12.	BanksAttSubs	0.01	0.01	-0.01	0.08	-0.02	-0.19	-0.35	-0.28	-0.24	0.02	0.85											
13.	ParentEqIn	0.11	0.22	0.23	0.06	0.15	-0.05	-0.01	-0.01	0.04	0.04	-0.03	0.07										
14.	ParentOwn	-0.01	0.06	0.06	0.02	-0.03	0.00	0.03	-0.05	0.01	0.02	-0.02	-0.04	0.12									
15.	SubsNumber	0.10	0.12	0.13	0.03	0.18	-0.02	0.00	0.00	0.02	0.02	-0.01	0.07	0.37	-0.07								
16.	CapexParent	-0.04	-0.09	-0.09	-0.02	-0.05	0.14	0.01	-0.08	-0.04	-0.03	0.03	0.09	-0.08	-0.03	-0.03							
17.	CapeSubsx	0.01	0.21	0.22	0.02	0.07	0.01	-0.02	-0.05	-0.04	0.00	0.04	0.11	0.17	-0.07	0.23	0.03						
18.	SalesParentSubs	0.02	0.04	0.04	0.02	0.04	0.06	0.01	-0.03	-0.04	-0.03	0.04	0.11	0.15	-0.03	0.25	0.08	0.17					
19.	SalesParentOut	0.05	-0.06	-0.07	0.03	0.00	0.01	-0.02	-0.02	0.01	0.00	0.03	-0.01	-0.14	0.04	-0.11	0.01	-0.09	-0.21				
20.	SalesSubsParent	0.05	0.19	0.20	0.03	0.11	0.00	-0.05	-0.04	0.03	0.03	0.02	0.10	0.34	-0.13	0.35	0.02	0.28	0.62	-0.08			
21.	SalesSubsOut	0.05	0.09	0.10	0.02	0.06	0.06	0.02	-0.01	-0.04	-0.03	0.03	0.06	0.13	0.01	0.12	-0.03	0.08	0.20	0.20	0.13		
22.	GroupSize	0.08	0.05	0.04	0.05	0.12	0.08	0.02	-0.03	-0.03	-0.03	0.01	0.17	0.25	-0.13	0.63	0.04	0.19	0.23	-0.18	0.24	0.11	
23.	Trend	-0.06	0.06	0.10	-0.08	0.02	-0.35	-0.15	0.03	0.27	0.25	-0.15	-0.25	0.12	0.02	0.05	-0.20	0.04	-0.14	-0.02	0.07	-0.15	-0.13

Notes: This Table shows the correlation between each pair of variables described in Table 1. The simple correlations were calculated from data for 42,792 business group-year observations of end-of-fiscal year values for FY1984 – FY2014 for listed, nonfinancial, Japanese business groups. Subscripts t refer to the current fiscal year; subscripts t-1 refer to the prior fiscal year. Column numbers refer to variables with the same row numbers. For descriptions and calculations of variables, see Table 1.

		GroupLendAll	ParentLendAll	ParentLendSubs	ParentLendOut	SubsLendOut
		(1)	(2)	(3)	(4)	(5)
1	IABuhhlehurst	-0.13 ***	0.13	0.11	-0.01	-0.03 **
••		(-4.11)	(1.50)	(1.57)	(-0.29)	(-2.07)
2	JABankcrisis	0.04	-0.12 *	-0.03	-0.14 ***	0.06 ***
		(1.55)	(-1.75)	(-0.47)	(-5.07)	(4.40)
3.	TakenakaPlan	0.22 ***	0.23 ***	0.44 ***	-0.21 ***	0.16 ***
		(8.53)	(3.32)	(7.26)	(-8.60)	(12.12)
4.	GFC	-0.06 **	0.30 ***	0.61 ***	-0.31 ***	-0.03 **
		(-2.33)	(3.59)	(8.06)	(-10.79)	(-2.50)
5.	GEAEarthquake	-0.11 ***	-0.07	0.36 ***	-0.38 ***	-0.05 ***
	1	(-3.14)	(-0.60)	(3.45)	(-9.89)	(-3.05)
6.	ParentEqIn	0.00 *	0.01 ***	0.01 ***	0.00	0.00 **
	-	(1.91)	(4.71)	(5.41)	(1.35)	(2.53)
7.	ParentOwn	0.00	0.01 ***	0.01 ***	0.00 ***	-0.00 ***
		(0.11)	(5.50)	(4.02)	(3.92)	(-3.85)
8.	SubsNumber	0.00 ***	0.01 ***	0.01 ***	-0.00 ***	0.00 ***
		(2.70)	(4.38)	(6.84)	(-5.70)	(7.69)
9.	CapexParent	-0.00	-0.03 ***	-0.03 ***	0.00	-0.00
		(-0.05)	(-4.37)	(-5.16)	(0.81)	(-1.43)
10.	CapexSubs	0.00	0.18 ***	0.15 ***	0.02 ***	0.01 ***
		(1.42)	(14.40)	(13.43)	(3.78)	(4.43)
11.	SalesParentSubs	-0.00	-0.03 ***	-0.03 ***	0.00	-0.00 ***
		(-1.11)	(-8.38)	(-9.24)	(1.22)	(-3.27)
12.	SalesParentOut	-0.00 ***	-0.02 ***	-0.01 ***	-0.00 ***	-0.00 ***
		(-5.40)	(-10.77)	(-9.61)	(-3.29)	(-5.23)
13.	SalesSubsParent	0.00	0.02 ***	0.02 ***	0.00 ***	0.00 ***
		(0.20)	(12.34)	(11.52)	(2.59)	(2.91)
14.	SalesSubsOut	-0.00	0.02 ***	0.03 ***	-0.01 ***	0.00 *
		(-0.85)	(5.83)	(7.82)	(-3.97)	(1.69)
15.	GroupSize	0.09 **	-0.86 ***	-0.94 ***	0.09 **	0.04 **
		(2.28)	(-6.72)	(-8.56)	(2.02)	(2.33)
16.	Trend	-0.02 ***	0.03 ***	0.04 ***	-0.01 ***	0.00
		(-9.74)	(5.21)	(7.83)	(-5.21)	(0.65)
17.	Constant	0.46	12.82 ***	12.48 ***	0.02	-0.07
		(1.10)	(9.03)	(10.24)	(0.05)	(-0.35)
	Adjusted R-squared	0.523	0.596	0.562	0.426	0.414

## Table 4.Lending by Parents and by Their Subsidiaries:Dummy Variables for Banking, Financial, and Economic Crises

Notes: This Table shows the estimated effects on internal and external lending by business groups, by parent companies, and by subsidiary companies based on 42,792 observations for FY1984 – FY2014. Dummy variables were included for the aftermath of the bursting of the Japanese "bubble economy", the Japanese banking crisis, the Takenaka bank plan, the global financial crisis, and the Great East Asia Earthquake. The controls shown in rows 6-17 and parent-company fixed effects were included. \*\*\*, \*\*, and \* indicate statistical significance at lower than 1%, 5%, and 10%. The ratios to their robust standard errors are shown in parentheses below estimated coefficients. For descriptions and calculations of variables, see Table 1.

		GroupLendAll	ParentLendAll	ParentLendSubs	ParentLendOut	SubsLendOut
		(1)	(2)	(3)	(4)	(5)
1.	BanksAttParent	0.91 ***	-0.28	0.36	-0.62 ***	0.52 ***
		(8.09)	(-0.87)	(1.33)	(-4.65)	(9.07)
2.	BanksAttSubs	-1.26 ***	-0.12	-1.86 ***	1.75 ***	-0.91 ***
		(-8.75)	(-0.31)	(-5.34)	(10.15)	(-12.01)
3.	ParentEqIn	0.00 **	0.01 ***	0.01 ***	0.00	0.00 ***
		(2.44)	(4.72)	(5.63)	(0.81)	(3.17)
4.	ParentOwn	-0.00	0.01 ***	0.01 ***	0.00 ***	-0.00 ***
		(-0.29)	(5.20)	(3.68)	(3.89)	(-4.37)
5.	SubsNumber	0.00 ***	0.01 ***	0.01 ***	-0.00 ***	0.00 ***
		(2.84)	(4.43)	(6.73)	(-5.31)	(7.78)
6.	CapexParent	-0.00	-0.03 ***	-0.04 ***	0.00	-0.00
		(-0.26)	(-4.50)	(-5.34)	(0.80)	(-1.61)
7.	CapexSubs	0.01 *	0.18 ***	0.15 ***	0.02 ***	0.01 ***
	-	(1.68)	(14.31)	(13.31)	(3.79)	(4.92)
8.	SalesParentSubs	-0.00	-0.03 ***	-0.03 ***	0.00	-0.00 ***
		(-1.14)	(-8.41)	(-9.28)	(1.20)	(-3.22)
9.	SalesParentOut	-0.00 ***	-0.02 ***	-0.01 ***	-0.00 ***	-0.00 ***
		(-5.52)	(-10.49)	(-8.80)	(-4.46)	(-5.20)
10.	SalesSubsParent	0.00	0.02 ***	0.02 ***	0.00 *	0.00 ***
		(0.29)	(12.45)	(12.05)	(1.73)	(3.16)
11.	SalesSubsOut	-0.00	0.02 ***	0.03 ***	-0.01 ***	0.00 *
		(-0.79)	(5.82)	(7.74)	(-3.84)	(1.74)
12.	GroupSize	0.08 **	-0.89 ***	-1.03 ***	0.15 ***	0.04 **
		(2.14)	(-6.94)	(-9.39)	(3.11)	(2.03)
13.	Trend	-0.02 ***	0.03 ***	0.04 ***	-0.01 ***	-0.00 **
		(-11.82)	(5.78)	(9.12)	(-6.15)	(-2.16)
14.	Constant	0.57	13.22 ***	13.53 ***	-0.56	0.06
		(1.33)	(9.25)	(11.06)	(-1.07)	(0.27)
	Adjusted R-squared	0.523	0.596	0.562	0.427	0.414

# Table 5.Lending by Parents and by Their Subsidiaries:<br/>Banks' Business Lending Attitudes as Measures of Banking, Financial,<br/>and Economic Conditions

Notes: This Table shows the estimated effects of commercial banks' attitudes toward business lending based on 42,792 observations for FY1984 – FY2014. Controls shown in rows 3-14 and parent-company fixed effects were included. *BanksAttParent* and *BanksAttSubs* refer to banks' attitudes reported in the TANKAN survey about loans to business of the sizes of each business group's parent company and its subsidiaries. The survey categorized companies by their equity. The survey reports the net percent of banks' that answered "accommodative" minus the percent of banks that answered "severe." The columns show the estimated effects on external and internal lending by business groups, by parent companies, and by subsidiaries. of parent companies. \*\*\*, \*\*, and \* indicate statistical significance at lower than 1%, 5%, and 10%. The ratios to their robust standard errors are shown in parentheses below estimated coefficients. For descriptions and calculations of variables, see Table 1.