COLLUSION AND OVERLENDING

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This study provides a theoretical background for collusion-induced overlending being the main cause of the 1997 Korean financial crisis. Our model consists of a lending institution, a borrowing chaebol of an unknown type, and an informed politician who can influence lending decision. We show that collusion can be formed between a low-type chaebol and the politician, and it may not be the lending institution's best interest to deter such collusion. This equilibrium, however, is possible only when the economic environment is favorable. When the economy deteriorates, the expectations of the fall of the collusion equilibrium can trigger financial crisis. (JEL G30, D82, O16)

I. INTRODUCTION

> For a long time have Korean companies been engaged in unbridled expansionism financed through loans, inefficient octopus style management, and over and duplicate investment, thus expediting the structural failure of the economy. This failure to concentrate on profits, consolidation and efficiency provided the fuse to the bankruptcy bombs that triggered the foreign exchange and economic crises. . . . The collusion between the conglomerates, financial sector and politicians made this financial monopoly possible. (*Chosun Ilbo*, December 26, 1997)

Collusion and overlending in the Korean financial sector may be best illustrated by the above editorial highlight of *Chosun Ilbo*, the most read newspaper in Korea. Its 1997 financial crisis is primarily triggered by continual bankruptcies of chaebols (conglomerates), which, with assistance from politicians, had borrowed heavily from financial institutions in financing their investment projects.[1] Unlike some other Asian countries experiencing problems in their financial sector due to shifts in investment projects toward real estates (such as Japan, Hong Kong, and Thailand), chaebols in Korea concentrated mostly on manufacturing activities.[2]

In this study, we establish a tractable model of overlending with three key players, namely, chaebols, financial institutions, and politicians, as highlighted in *Chosun Ilbo*. The model is designed to achieve two primary goals that are crucial for matching some key observations during the Korean turmoil. First, we illustrate how overlending can be an equilibrium outcome with collusion between chaebols and politicians when the economic environment is favorable. This occurs despite that such a collusion distorts normal borrowing-lending operation by causing a discernible shift in loan composition from more to less-productive investment projects. Second, we show that, as

*We thank George Akerlof, Been-Lon Chen, Mario J. Crucini, Curt Hunter, Sung-Hyun Kim, Jong-Wha Lee, Paul Romer, Henry Wan, and two anonymous referees for their valuable comments and suggestions. Needless to say, the usual disclaimer applies.

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1. Empirically, Bae, Kang, and Kim (2002) argue that the prevalent-related lending in Korea diverts significant resources from depositors to insiders. In the case of Japan, Morck and Nakamura (1999) suggest that a close bank-firm tie (Kisaikai) may reduce profitability. Our study emphasizes the role played by a third party, the politicians.
2. See Corsetti, Pesenti, and Roubini (1998).

ABBREVIATIONS

BIS: Bank for International Settlements
EIB: Export-Import Bank of Korea
GDP: Gross Domestic Product
KDB: Korea Development Bank
NBFI: Nonbanking Financial Institution

Economic Inquiry
(ISSN 0095-2583)
Vol. 45, No. 4, October 2007, 691–707

doi:10.1111/j.1465-7295.2007.00046.x
Online Early publication February 22, 2007

the economic environment gradually deteriorates, there can be a shift from a collusion to a no-collusion equilibrium. The combination of deterioration in fundamentals and expectations of an equilibrium shift can trigger economy-wide financial crisis.

More specifically, we construct a simple principal-supervisor-agent model of corruption and overlending. The principal is the formal authority of loan decision making of a financial institution (or, in short, the financial institution). The supervisor is a politician who serves as the informational intermediary in the borrowing-lending arrangement via his/her connections and networking.[3] The agent is a chaebol of an unknown type, which seeks for external financing of a set of risky projects. A politician's favorable signal about the borrowing chaebol's overall performance would grant the approval of the loan to finance an array of risky projects whose returns depend on idiosyncratic shocks that cannot be washed out in aggregation within the chaebol. As an outside alternative to making the loan, the financial institution can invest in the world capital market where a fixed rate of return is guaranteed. This portfolio decision depends on a comparison of the expected average returns on the given set of risky projects with the safe returns on investments in the world capital market. While both the chaebol's type and the state of nature are unobservable to the financial institution, we, for simplicity, assume that politician's connections and networking can fully uncover the true type of the chaebol. This valuable information possessed by the politician is one that the financial institution has an incentive to purchase, but a low-type chaebol has an incentive to conceal. Whether the politician ends up revealing truthfully this information depends on how much to obtain from the lender in terms of general support versus how much to gain from the borrower in terms of bribes or side payments. When a low-type chaebol has the politician on its side, information is distorted and a *collusion equilibrium* arises.[4]

Depending on the primitives of the economy, the financial institution may optimally choose not to deter collusion. Overlending, caused by collusion, can thus be an equilibrium outcome, which contrasts sharply with the conventional theory of looting, as in Akerlof and Romer (1993). The intuition of this result can be more easily understood from the following illustration. Suppose the chance of receiving favorite idiosyncratic shocks is high (good economic environment), the value of knowing the true type of the borrowing chaebol will not be high enough for the financial institution to deter the collusion between the chaebol and the politician, thus resulting in a collusion equilibrium. When the economic environment is bad, knowing borrower's true type becomes very valuable to the financial institution and the financial institution will optimally deter the collusion by providing the politician more support, leading to a *no-collusion equilibrium* where the financial institution invests in the world capital market upon meeting a low-type borrower. Notably, in which equilibrium an economy settles depends on the underlying economic environment, which differs from sunspot models.[5] A major result established by our theory is that a *continuously* deteriorating economic environment can lead to a *discrete* equilibrium shift eventually.

By undertaking a case study of the 1997 Korean financial crisis, we identify that the overlending problem, particularly from nonbank financial institutions to chaebols after the liberalization of the capital account, is a major source of the crisis. Our theory thus provides a plausible explanation for the occurrence of the financial crisis in Korea: the combination of continuous but noticeable deterioration in fundamentals and the expectations of a discrete equilibrium shift would trigger aggressive speculative attacks and passive withdrawals of investments, which can take place prior to the actual equilibrium shift.

A. Related Literature

In terms of fundamentals, financial crises may be divided into at least four broad categories: (i) financial illiquidity and bank runs,

3. Our model of the three-level financial institution-politician-chaebol problem is more general than it appears: one can easily apply it to cases with the politician replaced by a loan officer who has an objective different from that of the financial institution owner, or by a government regulator/accounting auditor.

4. The case of corruptive government can be viewed as a special case where bribes are sufficiently large for the collusion to emerge. For a survey of theoretical formation of collusion, see Tirole (1992).

5. Calomiris and Gorton (1991) find a wide range of evidence inconsistent with the sunspot view of banking crises.

as in Diamond and Dybvig (1983) and Chang and Velasco (2001); (ii) monetary expansion and collapse of the fixed exchange rate regime, as in Obstfeld (1994); (iii) monetization of government debts and collapse of the fixed exchange rate regime, as in Flood and Garber (1984) and Burnside, Eichenbaum, and Rebelo (2001); and (iv) moral hazard in the loans market and lending boom, as in Corsetti, Pesenti, and Roubini (1998), International Monetary Fund Survey (1998), and Krugman (1999). In the presence of participation externality and fixed entry cost, it is possible that an active financial market participation may lead to a harmful effect on the real economy as shown in Becsi, Wang, and Wynne (1999). Along the lines of research on overinvestment-induced crisis, there are some studies emphasizing on the increasing vulnerability in a domestic financial market to exogenous shocks, for example, Corsetti, Pesenti, and Roubini (1998) and Radelet and Sachs (1998). Due to its scale and timing, a popular view is that Asian financial crisis was propelled by self-fulfilling prophecies, as argued in Radelet and Sachs (1998). Overall, there lacks a consensus on the primary driving forces underlying these recent crises.

In terms of the methodology, two closely related studies are those of Akerlof and Romer (1993) and Kofman and Lawarree (1993). Akerlof and Romer argue that when the government guarantees the liabilities of financial institutions, bank owners may have a moral hazard problem, going bankrupt under some circumstances and causing net losses to the society (i.e., what they describe as a ''looting'' behavior, undertaking bankruptcy for profit). Although their focus is not on widely spread financial crises, the central role of the government (or politicians) is also a key feature in our study. In Kofman and Lawarree, a principal-supervisor-agent framework is constructed, as in our study. The three players in their study are an owner, an auditor, and a manager, where the emergence of collusion between a manager and an auditor within a single firm is examined. Thus, theirs is a model of production efficiency rather than a setup of financial crises.

The main difference between our study and the earlier literature is that we study in depth the underlying mechanism that gives rise to a collusion equilibrium featuring excessive lending to less-productive chaebols. In contrast with Akerlof and Romer, we allow the possibility that a financial institution may optimally choose not to deter a collusion between the borrowing chaebol and the politician. Thus, overinvestment in low-return projects can occur in equilibrium, even without a safety net provided by the government. In contrast with Kofman and Lawarree, we consider the lending relationship between a financial institution and a chaebol, with a third party seeking rent on providing information about chaebol's type. Moreover, since it may be a financial institution's best interest not to set up an incentive-compatible contract, overlending may occur without the typical crowding-out effect from loanable funds reallocation.

II. THE MODEL ECONOMY

Our model consists of three risk-neutral optimizing players: chaebols, financial institutions, and politicians. For simplicity, we restrict our attention to the case of a one-shot game where each financial institution can make a loan to exactly one chaebol and is networking with exactly one politician. This one-to-one relationship enables us to focus on the behavior of a ''representative'' financial institution-politician-chaebol trio within the principal-supervisor-agent framework.[6] The story can be outlined as follows. The chaebol of a particular type, measured by the ''average'' performance of the conglomerate as a whole, initiates an array of investment projects that requires external financing from the financial institution. In the presence of asymmetric information about this chaebol's type, the financial institution may utilize a politician's connection and networking to gain further insights and in return provide general support to the politician. We allow for the possibility of a collusion between a chaebol and a politician that would distort the information delivered to the financial institution concerning chaebol's type.[7]

6. In so doing, we simplify our analysis greatly by omitting any effects from competition within each group of players.

7. Even in an infinitely repeated game, we can still obtain an equilibrium with collusion and a relationship that links such an equilibrium outcome to economic fundamentals.

A. The Chaebol

The chaebol is owned by a risk-neutral optimizing entrepreneur who runs the entire conglomerate and acquires all profits. Each chaebol has many investment projects undertaken by various affiliated firms at a particular point in time. We focus only on those financed by the financial institutions in our model economy. Chaebols differ from multiple-plant, large-scale firms in three aspects: (i) they are not only large but widely spread to *several* industries, as a result, they have strong political power more than just "too big to fail"; (ii) debts carried by an affiliated firm of a chaebol are legally *not* liability to others under the same chaebol, as a result, the limited liability problem is more severe; and (iii) assets owned by some firms in a chaebol *can* often be used to finance other affiliated firms without formal transfer in accounting, as a result, individual firms are financially less constrained, and many chaebols can survive even with very high leverage ratios.

We measure the type of a chaebol by the average performance of the conglomerate as a whole. For simplicity, we normalize the size of the loan to 1. This normalization is to each project; a firm with more projects will have larger loans, and a chaebol with more borrowing firms will have larger debts. Moreover, the assumption of loans with fixed size is innocuous under our adverse selection setup because the size of the loan would not play any significant role in determining the outcome of the equilibrium. Upon receiving a loan, a chaebol undertakes investment projects with an average rate of return depending on its type as well as the state of nature.

For analytical convenience, we consider two types of entrepreneurs who operate chaebols at different levels of efficiency: high (h) and low (l). Entrepreneurs are born with an inherited type, where the entire economy is populated with a *predetermined* fraction π of high type and a fraction $(1 - \pi)$ of low type. By normalizing the cost of running a low-efficiency chaebol to zero, we set that of running a high-efficiency chaebol at $c > 0$.

The output of these externally financed investment projects as a whole, denoted Y, also depends on idiosyncratic productivity shocks. Such shocks do not occur symmetrically to all chaebols (due to their different industry specificity and product concentration). Such shocks to various investment projects need not wash out in aggregation (due to mutual dependence and linkage between different projects). We simply measure the state of nature to each chaebol by two scenarios: a "good" state (g) with probability p, and a "bad" state (b) with probability $(1 - p)$.

Combining these, the output levels associated with high/low types of chaebols and good/bad states of nature are given by

		State of Nature	
Output		***g***	***b***
Effort	h	$1 + H$	$1 + L$
	l	$1 + L$	1

That is, we have three possible outcomes of production: $Y(h, g) = 1 + H$, $Y(h, b) = Y(l, g) = 1 + L$, and $Y(l, b) = 1$, where $L < H$.

We assume that output is observable, but financial institutions observe neither borrowers' type nor the state of nature. As a consequence, the financial institution cannot tell in the case of $Y = (1 + L)$ whether it is a result of a bad-state or a less-efficient chaebol.[8] Due to this asymmetric information, a low-type chaebol may be able to bribe the politician to get the loan approved by the financial institution. The endogenous amount of the bribe, or the up-front side payment, is denoted by s. Because of the special feature that a chaebol can use cash flows from other affiliated firms to finance the bribe, we, for simplicity, assume that the wealth constraint, that the amount of bribes be less than the total value of outputs of its externally financed investment projects, never binds.

B. The Politician

Due to their connections and networking, politicians have superior knowledge about chaebols' true types. Upon an inquiry from the financial institution, the politician can deliver a signal about the chaebol's type as either high or low. Should such networking prove to be profitable, the financial institution

8. Note that the two-dimensional uncertainty setup (a chaebol's type and the state of nature) is needed to generate this case. This is crucial to our result of having a collusion equilibrium; otherwise, the financial institution can design a repayment schedule, based only on the project outcomes, so that the low-type chaebols are deterred in the first place.

would be willing to provide general supports to the politician in return. Such supports include preferred customer discounts for the politician's financial needs and nonpecuniary political supports including lobbying. For analytical convenience, we measure all these in the goods equivalence and regard such political tokens, denoted t, as a pure transfer from the financial institution to the politician. That is, t measures both the cost incurred by the financial institution and the benefit received by the politician. Furthermore, in forms of the monetary equivalence, political tokens provided by the financial institution and bribes offered by the low-type chaebol are viewed as perfect substitutes by the politician.

Among all politicians, a fraction $\alpha \in (0,1)$ are honest and always tell the truth, and the remaining fraction $(1 - \alpha)$ of dishonest ones may lie about the true type of low-type chaebols. Particularly, a dishonest politician always signals truthfully about a high-type chaebol but may lie about the true type of a less-efficient chaebol, depending on the size of the bribe versus the value of the political token.[9] The objective of a politician is to maximize the expected net payoff. In the case of providing a truthful signal, the politician's payoff is derived only from the political token. If a politician lies about the chaebol's type, the payoff consists of a bribe from low-type chaebol and, when his/her dishonesty is not detected, a political token from the financial institution. Notably, a dishonest politician gains nothing from the financial institution when the output turns out to be unity because in this case the politician's dishonesty is fully revealed.[10]

C. The Financial Institution

The financial institution is endowed with an amount of funds normalized to 1, which can be used to finance a chaebol's risky projects or invested in the world capital market to earn a fixed rate of return $\boldsymbol{B}(>0)$. The financial institution can set the size of the political token ($\boldsymbol{t}$) and the loan rate ($\boldsymbol{R}$) to maximize its expected profit. If the output level turns out to be unity, then the financial institution can infer that the politician lied and therefore does not need to incur a cost of $\boldsymbol{t}$. Consider a financial market with limited liability where the assets of other affiliated firms (i.e., those unrelated with the particular lending) in a chaebol cannot be used as collaterals. Thus, the amount that the financial institution can collect from the chaebol is bounded by the realized value of output accrued from these funded projects. For example, when the output level is 1, the financial institution can only recover the principal. Since our goal is to study under what conditions collusion can happen (as observed in reality), we only restrict our attention to equilibria with the optimal loan rate satisfying $\boldsymbol{R} \leq \boldsymbol{L}$, in which low-type chaebols are not fully deterred. We will show later that this requires the following condition on economic primitives.

ASSUMPTION 1: $c \geq p(H - L)$

This assumption requires that the effort cost incurred by an entrepreneur operating a chaebol at a higher level of efficiency (c) is sufficiently high that the financial institution cannot use the interest rate alone to screen out low-type chaebols to achieve a separating equilibrium.

We are now ready to be more specific about what we mean by "overlending." Consider,

ASSUMPTION 2: $pH + (1 - p)L - c > B > pL$.

This assumption implies, from social planner's viewpoint, it is efficient to only have the high-type chaebols undertake risky projects. Therefore, we refer "overlending" to the situation where low-type chaebols are financed by financial institutions and undertake risky projects.[11] Assumptions 1 and 2 will be imposed throughout the article.

D. Timing of Events

The timing of events can now be summarized as follows:

9. We can allow the politician to demand for bribes from a high-type chaebol for not misreporting its true type. However, with monopoly power, the lending bank always sets the repayment schedule high enough to leave no room for such bribes to exist in equilibrium (see Section IV).

10. The agreement of the financial institutions' provision of the political token is assumed enforceable and nonrenegotiated.

11. Note that it is socially inefficient simply because the low-type chaebols cannot produce enough, in expected term, to cover the opportunity cost of the resource. Another possible inefficiency resulting from the misallocation of fund, namely a "crowding-out" effect, is absent from this setup.

(i) The representative chaebol applies for a loan from the representative financial institution to initiate an array of investment projects prior to the productivity shock.

(ii) The representative financial institution is networking with the representative politician to gain further insights about the chaebol's type prior to making the loan decision.

(iii) A low-type chaebol can bribe a dishonest politician, with an up-front side payment (s), for him/her to signal to the financial institution untruthfully about its true type.

(iv) Upon receiving a "high" signal about the chaebol's type, the financial institution approves the loan, the chaebol engages in the proposed risky projects, and then the shock is realized; upon receiving a "low" signal, the financial institution instead invests in the world capital market to earn a riskless return B.

(v) Upon the realization of output, the chaebol pays back the loan (either $1 + R$ or 1).

(vi) The politician receives the political token (t) from the financial institution unless his dishonesty is detected (in the case when output turns out to be 1).

In summary, a dishonest politician chooses between lying and telling the truth. A chaebol decides whether to undertake a particular set of risky projects at a given point in time and if it is a low type, how much it can afford to bribe a politician. A financial institution determines (i) whether to engage in the set of risky projects at all and (ii) if the answer is positive, how to set the interest rate (R) and the amount of political tokens to support the politician (t) to maximize its expected profits. Our analysis consists of two major steps, which we conduct in the next two sections. In Section III, we study the representative politician's incentive-compatibility constraint, the representative chaebol's participation constraint, and the financial institution's participation constraint for a given pair (R, t). In Section IV, we characterize the optimal incentive-compatible contract (R, t) chosen by the financial institution and then examine under which circumstances collusion may emerge in equilibrium.

III. INCENTIVE-COMPATIBILITY AND PARTICIPATION CONSTRAINTS

We now analyze each of the three players' decision making under a given pair (R, t).

A. The Chaebol's Participation Constraint

The expected profit of a representative chaebol of a particular type (high or low) is equal to the expected output net of the loan repayment, the effort cost (positive if it is high type and zero otherwise), and the amount of side payment to bribe a dishonest politician (positive if it is low type and zero otherwise). Thus, the expected profit of a high-type chaebol is:

$$\mathrm{E}[\Pi_h] = pH + (1-p)L - R - c, \tag{1}$$

whereas provided that a potential dishonest politician would accept bribes and signal untruthfully to get the loan approved, the expected profit of a low-type chaebol is:

$$\mathrm{E}[\Pi_l] = (1-\alpha)[p(L-R) - s]. \tag{2}$$

By normalizing its outside option to zero, the chaebol's participation constraint is one such that its expected returns are nonnegative for a given pair (R, t). Let $\bar{R} \equiv pH + (1-p)L - c$. From Equation (1), a high-type chaebol's participation constraint is simply

$$R \leq \bar{R}. \tag{3}$$

Similarly, Equation (2) implies that a low-type chaebol's participation constraint can be written as:

$$s \leq s^{\max} = p(L-R). \tag{4}$$

This constraint has an alternative interpretation: it gives the *maximum* amount of side payment that a low-type chaebol is willing to bribe a politician ($s^{\max}$). If $s^{\max} > 0$, a low-type chaebol will be willing to participate. Note that if high-type chaebols' participation constraint is satisfied ($R \leq \bar{R}$), $s^{\max} > 0$ must hold true under Assumption 1 since it implies $\bar{R} < L$. This says, in any equilibrium, if the high-type chaebols are willing to participate, so are the low types.

B. The Politician's Incentive-Compatibility Constraint

When a dishonest politician meets a low-type entrepreneur operating a chaebol and receives a side-payment offer, he/she may decide to take it by signaling untruthfully if accepting the bribe is proven profitable. If

the dishonest politician signals truthfully, he/she will receive only the political token t provided by the financial institution. If the dishonest politician signals untruthfully about the true type of the low-type chaebol to accept the bribe, his/her expected payoff is: $p(t + s) + (1 - p)(0 + s) = s + pt$. The difference between these payoffs accrued from the two possible actions, $s - (1 - p)t$, measures the incentive to accept the bribe. That is, if this payoff differential is positive, a dishonest politician will choose to accept the bribe; otherwise, he/she will decline it. This implies that the *minimum* amount of side payment that a dishonest politician is willing to be bribed ($s^{\min}$) is one such that the payoff differential is zero

$$s^{\min} = (1 - p)t. \tag{5}$$

After all, we need to compare $s^{\max}$ and $s^{\min}$ to see whether a particular pair of $(\boldsymbol{R}, \boldsymbol{t})$, given p and L, may leave room for bribery. If the amount that a low-type chaebol can afford does not exceed what a dishonest politician demands ($s^{\max} \leq s^{\min}$), collusion cannot arise. Assuming that collusion does not occur when a dishonest politician is indifferent between lying and telling the truth, we can use Equations (4) and (5) to derive the politician's incentive-compatibility constraint, or *no-collusion condition*, as

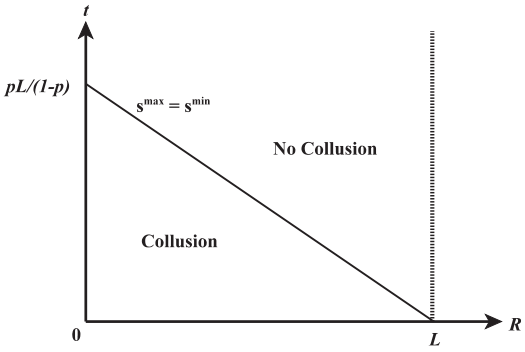
$$t \geq \frac{p}{1 - p}(L - R). \tag{6}$$

This condition states that in order for the dishonest politician to reveal true information, the financial institution must not only "outbid" the low-type chaebol's offer ($p(L-R)$) but also pay the politician a sufficient amount of premium so that he/she would not gamble on the unverifiable case (when output is $(1 + L)$). Otherwise, collusion will emerge, and the *collusion condition* can be written as

$$t < \frac{p}{1 - p}(L - R). \tag{6'}$$

Figure 1 shows these two inequalities in (R, t) space.

FIGURE 1
Room for Bribery



C. The Financial Institution's Participation Constraint

Provided an active participation of the high-type chaebol, we can examine the financial institution's lending decision under two different scenarios, depending on whether the combination of (R, t) allows for bribery or not. If the politician's incentive-compatibility constraint (6) is satisfied, the politician will deliver the signal to the financial institution truthfully. In this case, the participating financial institution's expected profit depends only on the chaebol's type:

$$\Pi_N = \pi R + (1 - \pi)B - t. \tag{7}$$

Instead of investing in the world capital market to receive a fixed return, the financial institution is willing to make a loan to a high-type chaebol iff $\prod_N \geq B$. From Equation (7), the financial institution's participation constraint under no collusion can thus be written as

$$t \leq \pi(R - B). \tag{8}$$

The LHS of Equation (8) is the cost of engaging a loan, and the RHS is the expected benefit.

If $t < [p/(1 - p)](L - R)$, a dishonest politician will lie about the true type of the low-type chaebol, under which a participating financial institution's profit becomes

$$\Pi_C = [\pi + (1 - \pi)(1 - \alpha)p]R + [(1 - \pi)\alpha]B - [1 - (1 - \pi)(1 - \alpha)(1 - p)]t. \tag{7'}$$

Here, $[\pi + (1 - \pi)(1 - \alpha)p]$ in the first term is the sum of the probabilities of the two cases

with repayments $\boldsymbol{R}$ (i.e., the output must be either $1 + H$ or $1 + L$): (i) π indicates the probability of finding a high-type chaebol and (ii) $(1 - \pi)(1 - \alpha)p$ the probability of meeting a low-type chaebol, networking with a dishonest politician who signals untruthfully to have the chaebol's loan application approved, and the state of nature turns out to be good. The probability $[(1 - \pi)\alpha]$ in the second term is associated with the case where the financial institution meets a low-type chaebol and an honest politician, under which it chooses to invest in the world capital market to earn a fixed return B. The last term is the financial institution's expected cost of providing general support to the politician. Note that with probability $[(1 - \pi)(1 - (\alpha)(1 (- p)]$, the state of nature is bad, and in this case, the financial institution is capable of detecting the chaebol's true type and the false signal from the dishonest politician, thus withdrawing its political support.

As long as this expected profit exceeds the best alternative B, the financial institution is willing to make a loan to the chaebol. Therefore we can derive financial institution's participation constraint under collusion as:

$$(8') \qquad t \leq \frac{\pi + (1-\pi)(1-\alpha)p}{1-(1-\pi)(1-\alpha)(1-p)}R - \frac{1-(1-\pi)\alpha}{1-(1-\pi)(1-\alpha)(1-p)}B.$$

D. Collusion and No-Collusion Sets

We are now prepared to define a no-collusion set $\mathbf{N}(\boldsymbol{\nu})$ as all combinations of $(\boldsymbol{R}, \boldsymbol{t})$ for a given parameter configuration $\boldsymbol{\nu} = (H, L, c, B, \pi, \alpha, p)$, such that collusion is deterred and both financial institution's and high-type chaebols' participation constraints are satisfied. That is

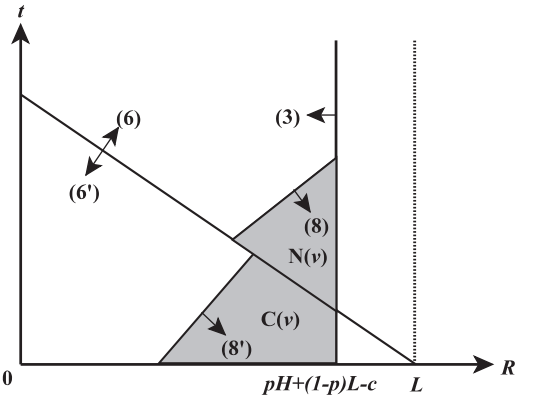
$$\mathbf{N}(\boldsymbol{\nu}) \equiv \{(R,t) : (3), (6), (8) \text{ are satisfied}\}.$$

For the case with collusion, we can define a collusion set $\mathbf{C}(\boldsymbol{\nu})$ in a similar fashion:

$$\mathbf{C}(\boldsymbol{\nu}) \equiv \{(R,t) : (3), (6'), (8') \text{are satisfied}\}.$$

An example is illustrated in Figure 2 where the upper right shaded area represents set $\mathbf{N}(\boldsymbol{\nu})$ and the lower left set $\mathbf{C}(\boldsymbol{\nu})$. The reader should be alerted that, depending on the parameter configuration $\boldsymbol{\nu}$, either set or both could be empty.

FIGURE 2
Collusion Set and No-Collusion Set



IV. COLLUSION EQUILIBRIUM

We have studied possible combinations of $(\boldsymbol{R}, \boldsymbol{t})$ for collusion to occur. By permitting financial institutions to choose $\boldsymbol{R}$ and $\boldsymbol{t}$, we now examine whether it is possible to design and implement an incentive mechanism to deter collusion and, if the answer is positive, whether it is their best interest to do so. We will derive conditions for collusion to arise endogenously as a result of financial institutions' inability to deter it or its best interest not to do so.

A. Collusion as Financial Institutions' Inability to Deter

The first scenario for collusion to emerge is when financial institutions *cannot* deter it, that is, there does not exist any combination of $(\boldsymbol{R}, \boldsymbol{t})$ to yield no room for bribery and at the same time to satisfy both financial institutions' and high-type chaebols' participation constraints (implying $\mathbf{N}(\boldsymbol{\nu}) = \phi$). Using Figure 3, we obtain the underlying set of parameters to support this outcome

$$\frac{[1-(1-\pi)\alpha]B}{\pi+(1-\pi)(1-\alpha)p} \leq \overline{R} < \frac{pL+\pi(1-p)B}{\pi+(1-\pi)p}. \quad (9)$$

FIGURE 3
Financial Institutions' Optimal Decisions When Set $N(\nu)$ Is Empty

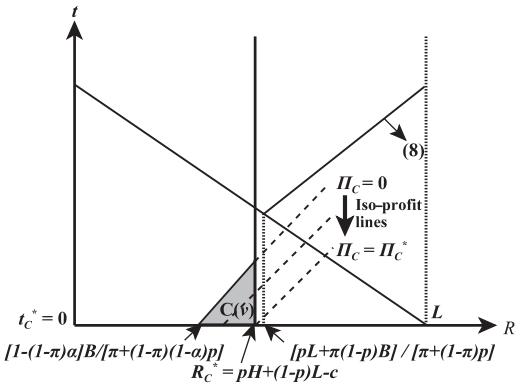
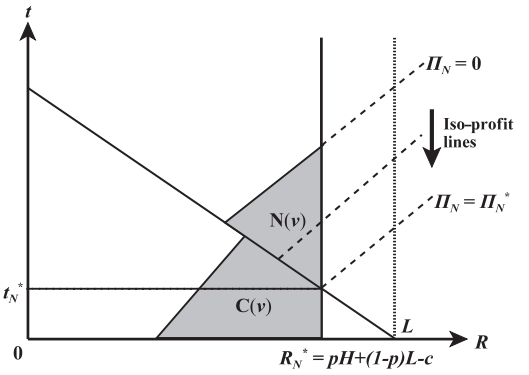


FIGURE 4
Financial Institutions' Optimal Decisions Under No Collusion



The last term is the lowest possible interest rate under which a right amount of political token exists to satisfy both politician's incentive-compatibility constraint and financial institution's participation constraint. If it is still greater than what a high-type chaebol can afford ($\bar{R}$), the no-collusion equilibrium cannot exist. The first inequality simply ensures the collusion set is not empty at the same time.

Given Equation (9) is satisfied, a financial institution's profit-maximization problem is given by:

$$\max_{(R,t)\in C(\nu)} \Pi_C = [\pi + (1-\pi)(1-\alpha)p]R + [(1-\pi)\alpha]B - [1-(1-\pi)(1-\alpha)(1-p)]t.$$

Utilizing Figure 3, we can solve: $R_C^* = \bar{R}$ and $t_C^* = 0$. Since collusion occurs in equilibrium, dishonest politicians must be untruthful about the low type and hence no political token can financial institutions provide to politicians ($t_C^* = 0$). Additionally, the optimal interest rate R_C^* should be set as high as possible by just permitting active participation by the high type. From Equation (7′), the resulting profit is given by

$$\Pi_C^* = [\pi + (1-\pi)(1-\alpha)p]\overline{R} + [(1-\pi)\alpha]B. \quad (10)$$

Summarizing,

PROPOSITION 1: *If the underlying parameter configuration* $\boldsymbol{\nu} = (H, L, c, B, \pi, \alpha, p)$ *satisfies Equation (9), then financial institutions cannot deter collusion and optimally set* $R_C^* = \bar{R} = pH + (1-p)L - c$ and $t_C^* = 0$.

B. Collusion as Financial Institutions' Unwillingness to Deter

The more interesting scenario is that even if financial institutions are able to deter collusion, they may rationally choose not to. The trade-off facing financial institutions is the cost of providing political tokens to induce truthtelling versus the cost from permitting collusion.

When the economic primitives satisfy

$$(11)\quad \frac{[1-\alpha(1-\pi)]B}{\pi + p(1-\pi)(1-\alpha)} < \frac{pL + \pi(1-p)B}{\pi + (1-\pi)p} \leq pH + (1-p)L - c,$$

both $\mathbf{N}(\boldsymbol{\nu})$ and $\mathbf{C}(\boldsymbol{\nu})$ are nonempty. Since a participating financial institution's profit-maximization problem is exactly the same as in Section IV.A whenever it permits collusion, its correspondent choices must be R_C^* and t_C^* and the resulting profit be Π_C^*. When a financial institution chooses to deter collusion, it solves

$$\max_{(R,t)\in \mathbf{N}(\nu)} \Pi_N = \pi R + (1-\pi)B - t.$$

Using Figure 4 and Equation (6) with equality, the solution is: $R_N^* = \bar{R}$ and $t_N^* = [p/(1-p)](L - R_N^*)$. The resulting profit becomes:

$$\Pi_N^* = \frac{\pi + (1-\pi)p}{1-p}[pH + (1-p)L - c] + (1-\pi)B - \frac{p}{1-p}L. \quad (12)$$

To find the condition under which financial institutions find it optimal not to deter collusion, we calculate the profit differential between no collusion and collusion as

$$\Pi_N^* - \Pi_C^* = (1-\pi)(1-\alpha)(B - p\bar{R}) - \frac{p}{1-p}(L - \bar{R}), \quad (13)$$

which is negative iff

$$[pH + (1-p)L - c] < \frac{pL - (1-\pi)(1-\alpha)(1-p)B}{p[1-(1-\pi)(1-\alpha)(1-p)]}. \quad (14)$$

Note that we can interpret the first term in the RHS of Equation (13) as how much a financial institution values the information provided by the networking politician, and the second term as the cost of acquiring it. A financial institution will choose not to induce truthtelling if its cost exceeds the benefit. Combining the second inequality of Equations (11) and (14), we obtain the condition under which financial institutions optimally choose to allow for collusion in equilibrium:

PROPOSITION 2: *If the underlying parameter configuration* $\boldsymbol{\nu} = (H, L, c, B, \pi, \alpha, p)$ *satisfies*

$$\frac{pL + \pi(1-p)B}{\pi + (1-\pi)p} \leq [pH + (1-p)L - c] < \frac{pL - (1-\pi)(1-\alpha)(1-p)B}{p[1-(1-\pi)(1-\alpha)(1-p)]}, \quad (15)$$

then financial institutions will optimally choose not to deter collusion.

C. Existence and Characterization of Collusion Equilibrium

From Propositions 1 and 2, we can establish the main theorem that determines when collusion will arise as a result of either financial institutions' *inability* or *unwillingness* to deter it. Specifically, this is done by combining the first inequality of Equations (9) and (14).

THEOREM: *If the underlying parameter configuration* $\boldsymbol{\nu} = (H, L, c, B, \pi, \alpha, p)$ *satisfies*

$$\frac{[1-(1-\pi)\alpha]B}{\pi + (1-\pi)(1-\alpha)p} \leq [pH + (1-p)L - c] < \frac{pL - (1-\pi)(1-\alpha)(1-p)B}{p[1-(1-\pi)(1-\alpha)(1-p)]}, \quad (16)$$

then a collusion equilibrium will arise. The likelihood of collusion equilibrium is

(i) decreasing in financial institutions' outside option (B),

(ii) increasing in their chance to meet a high-type chaebol (π),

(iii) increasing in the proportion of honest politicians (α),

(iv) increasing in the probability of the good state (p) for sufficiently high value of p.

One can see from Equation (16) that a decrease in B or an increase in π or α would make the lower bound smaller and the upper bound larger so that Equation (16) is more likely to hold true. Intuitively, this economy tends to settle in the collusion equilibrium if (i) B is small so that financial institutions' cost of lending money to low-type chaebols is low or (ii) π or α is large so that the chance of being matched with low-type chaebols or with a dishonest politician is low.

Furthermore, an increase in p makes the first inequality in Equation (16) more likely to hold since the riskless investment in the world capital market becomes more unappealing. What happens to the second inequality in response to an increase in p is more complicated as it results in two effects. First, financial institutions will receive higher returns from financing low-type chaebols and hence are more reluctant to deter collusion. The second effect is concerned with financial institutions' cost of detecting low-type chaebols, namely the amount of political tokens. On the one hand, since low-type chaebols' expected return from undertaking a project becomes higher, given the same R they are able to make a higher offer to bribe the politicians. On the other hand, however, financial institutions will

TABLE 1
Precrises Financial Performance and Manufacturing Financing in Korea

Major Financial Indicators	%
Growth rate of total loans to GDP ratio by *International Financial Statistics* (1990–1996)	17
Percentage of nonperforming loan (1996)	16
Foreign debt to GDP ratio by *World Development Report* (1990–1996)	13–18
Short-term liabilities to total liabilities ratio (end of 1996)	67
Short-term liabilities to foreign reserve ratio (end of 1996)	213
Internal financing ratio for large enterprises with 300 or more employees (1997)	21.8
Internal financing ratio for small/medium enterprises (1997)	33.6
Debt-equity ratio (1997)	396.3

Sources: Computed using data from the BIS, unless otherwise noted.

Notes: Based on Financial Statement Analysis for 1997 (by Bank of Korea, 1998), the Internal Financing Ratios in Japan (1996), Taiwan (1995), and the United States (1996) were 34.1, 53.9, and 39.4, respectively, whereas the Debt-equity ratios in the respective countries were 193.2, 85.7, and 153.5.

charge a higher interest rate, $\bar{R} = pH + (1-p)L - c$, under a higher value of p. As a consequence, it is not clear whether it becomes easier or more difficult for financial institutions to outbid low-type chaebols. It turns out that the first effect always dominates the second one and therefore the second inequality in Equation (16) is more likely to hold under a higher p.[12] That is, when the economy environment is favorable (high p), financial institutions tend not to deter collusion.

V. APPLICATION: A CASE STUDY OF THE 1997 KOREAN FINANCIAL CRISIS

We now study the case of the 1997 Korean financial crisis.

A. General Economic and Financial Development

From Table 1 and Figures 5–7, we have four useful observations prior to its 1997 crisis:[13]

Obs 1. There were negative fundamental shocks in the real sector: its growth rate declined in 1996 (from an average of 7.5% over 1990–1995 to 6.8% in 1996), and its trade deficits continued to increase since 1993 (reaching approximately 5% of gross domestic product [GDP] in 1996), though the inflation rate was rather steady (around 6%) and the government budget deficits were moderate (averaged 0.23% of GDP during 1990–1996).

Obs 2. Its financial sector exhibited a lending boom (measured at 17% over 1990–1996), with relatively low internal financing ratio (particularly, 21.8% for large enterprises with 300 or more employees), much higher financial leverage (396%), and a relatively high percentage of nonperforming loans (16%).

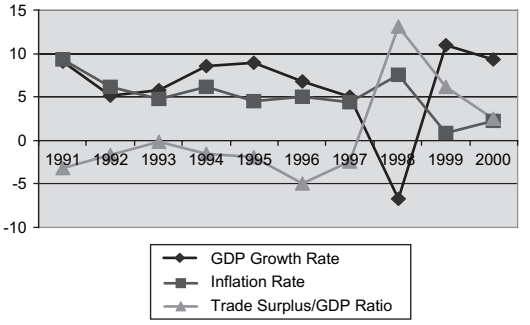
Obs 3. Its currency, won, suddenly depreciated in 1996 (by 8.9%), and its stock prices suddenly dropped during 1996 (by 26.2%).

Obs 4. There were no sizable foreign debt accumulated (from 13% to 18% over 1990–1996), and the illiquidity problems is not too severe compared to other better performed Asian economies (with the short-term liabilities toward the Bank for International Settlements, or, BIS in short, to total liabilities ratio at an acceptable 67%, which was lower than the comparable figures of 82%–92% in the other three Asian Tigers).

12. To prove this, denote the last term in Equation (16) as $\Lambda(p)$ where p ranges from 0 to B/L (the highest admissible value for p implied by Assumption 2). Straightforward calculation shows that $\Lambda(p)$ is (i) strictly increasing from $-\infty$ to L, which is greater than the second term in Equation (16) by Assumption 1, and (ii) strictly concave. This implies that there exists a unique p_0 such that the second inequality in Equation (16) holds true iff $p > p_0$.

13. Further data analysis is available upon request from the authors.

FIGURE 5
Major Macroeconomic Indicators in Korea (1991–2000, all in %)



After the crisis, one can further observe

Obs 5. There were significant depreciation in won and decline in stock prices (while won lost half of its nominal value and 48% of its purchasing power from the end of 1996 to the end of 1997, the stock price index decreased by 46%).

Obs 6. While growth declined sharply (from 6.8% in 1996 to 5.0% in 1997 to a historically low −6.7% since the first oil crisis), trade deficits continued (measured −2.4% of GDP in 1997) and foreign reserves shrank (by about 1 mo of total imports in 1997).

Obs 7. Inflation was quite stable (from an average of 6.0% over 1990–1996 to 5.9% over 1997–1998 and to 1.6% over 1999–2000).

In summary, these observations have painted a fairly clear picture: (i) the causes of 1997 financial crisis in Korea were not purely nonfundamental, though the crisis might likely be magnified by pessimistic expectations and society-wide losses in confidence (see Obs 1–Obs 3); (ii) financial illiquidity and monetary/fiscal policy-led collapse of the fixed exchange rate regime were unlikely to be the major sources of the crisis (see Obs 1, Obs 4, and Obs 7); and, (iii) by eliminating alternative hypotheses, it seems reasonable to conclude that excessive lending provided by financial institutions was most probably responsible for the crisis. To support the last argument, we must examine the financial structure of the Korean economy more thoroughly, to which we now turn.

FIGURE 6
Exchange Rate (won per U.S. dollar)

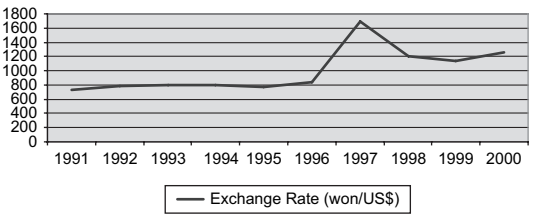
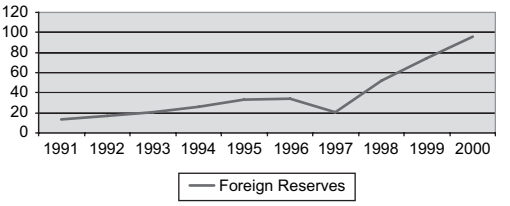


FIGURE 7
Foreign Reserves (in billions U.S. dollar)



B. Financial Structure

Historically, there have been favorable credits toward large enterprises, which reflected the intimacy between financial institutions and chaebols (as reported in Table 1, the average internal financing ratio of large enterprises was much lower than that of small and medium enterprises). Indeed, financial institutions in Korea, compared to those in Hong Kong, Singapore, and Taiwan, have paid more attention to their merits measured by the size of loan services, which inevitably leads to overlending. In particular, after the liberalization of capital account in 1991, external liabilities (including external debts, offshore borrowing of Korean financial institutions, and borrowing in foreign currency by Korean financial institutions' oversea branches) began to grow from U.S.$6.2 billion to U.S.$164 billion from 1992 to 1996, where almost three-fourths were borne by financial institutions (Table 2).

First, we note that the market structure of financial institutions is crucial for the

TABLE 2
External Liabilities of Financial Institutions and Corporations in Korea (in billions U.S.$)

	1992	1993	1994	1995	1996	1997	1998
Total external liabilities	62.9	67.0	88.7	119.7	164.3	158.1	149.4
1. Financial institutions' liabilities	43.6	47.5	65.1	90.5	116.5	89.6	71.9
2. Corporations' liabilities	13.7	15.6	15.6	26.1	41.8	46.2	41.0
3. Public sector's liabilities	5.6	3.9	8.0	3.1	6.0	22.3	36.5

Source: Data from the Ministry of Finance and Economy, Korea.

Notes: "External liabilities" include external debts, offshore borrowing of Korean financial institutions, and borrowing in foreign currency of Korean financial institutions' overseas branches.

vulnerability of the overlending problem in Korea. From Table 3, the shares of banking institutions (commercial and specialized banks) on deposit and loan markets in Korea have declined in the past two decades. Their roles had been replaced by nonbanking financial institutions (NBFIs) in a fast pace. While the Bank of Korea had complete supervisory authority over commercial banks and appropriate levels of controls over specialized banks, the supervision on NBFIs had never been clearly institutionalized. Due to the absence of limitations on ownership regulations, those large chaebols owned a significant portion of NBFIs. With poor monitoring, the rapid growth in the businesses of NBFIs had been a result of their excessive lending to formally affiliated or informally colluded chaebols, illustrating a course of crony capitalism.

Next, by reviewing the financial status of top 30 chaebols in Korea at the end of 1996 (see Table 4), one can easily identify the tendencies of overlending to chaebols. In fact, the net profits of the 30 largest chaebols were close to zero, with 13 of them running negative profits. Financial leverage (the debt to equity ratio) was uniformly high for all chaebols. Implicit government safety net for financial institutions under the notion of "too big to fail" together with a weak supervisory system resulted in excessive risk taking. After the financial crisis, 12 financially weak chaebols (Daewoo, Ssangyon, Kia, Halla, Donga Const., Jinro, Dongguk Jaekang, Haitai, New Core, Sammi, Sinho Jaeji, and Hansin Kongyong, whose financial leverage averaged 1563.9%) had either declared bankruptcies or been in the insolvency state by the end of 1999. Thus, financially weaker chaebols had borrowed more excessively from financial institutions.

Among these NBFIs, two big development institutions, Export-Import Bank of Korea (EIB) and Korea Development Bank (KDB), provided loans with relatively lower interest rates (compared to commercial and specialized banks) using government funds, special debentures, and foreign capitals. Due to their low-rates offerings, EIB and KDB had attracted a large fraction of lending business in the 1990s. Table 5 shows the composition of total loans in EIB, where the total

TABLE 3
Trends in Market Share of Nonbank Financial Institutions in Korea (in %)

	1980	1985	1990	1995	1998
Deposits	29.1	46.4	59.0	72.2	72.2
Loans and discounts	36.7	41.6	51.7	63.5	62.1

Source: Bank of Korea.

Notes: As of the end of June 1999, nonbank financial institutions operated businesses of five types: (i) development (KDB and EIB), savings (trust accounts of banks, mutual savings and financial companies, credit unions, mutual credit facilities, community credit cooperatives, and postal savings), (iii) investment (merchant banking corporations, securities investment trust companies, and Korea Securities Finance Corporation), (iv) insurance (life insurance companies and postal life insurance), and (v) other financial institutions (securities companies, investment advisory companies, credit guarantee funds, non–life insurance companies, leasing companies, venture capital companies, and installment credit companies).

TABLE 4
Financial Situations of Top 30 Chaebols in Korea at the End of 1996 (in trillions won)

	Chaebol	Assets	Debts	Sales	Net Profit	Debt/Equity Ratio (%)
1	Hyundai	53.18	43.32	68.01	.18	439
2	Samsung	50.86	37.04	60.11	.18	268
3	Lucky Goldstar	37.07	28.77	46.67	.36	347
4	Daewoo	34.21	26.38	38.25	.36	337
5	Sunkyong	22.73	18.04	26.61	.29	385
6	Ssangyong	15.81	12.7	19.45	−.10	409
7	Kia	14.16	11.89	12.10	−.13	524
8	Hanjin	13.90	11.79	8.7	−.19	557
9	Hanhwa	10.97	9.72	9.69	−.18	778
10	Lotte	7.75	5.10	7.19	.05	191
11	Kumho	7.40	6.12	4.44	−.02	478
12	Halla	6.63	6.32	5.29	.02	2068
13	Doosan	6.40	5.59	4.05	−.11	692
14	Donga Construction	6.29	4.91	3.89	.04	355
15	Daelim	5.79	4.59	4.83	.01	380
16	Hansol	4.79	3.71	2.55	−.01	343
17	Hyosung	4.12	3.25	5.48	.04	373
18	Jinro	3.94	3.90	1.48	−.16	8599
19	Kolon	3.80	2.89	4.13	.02	317
20	Dongguk Jaekang	3.70	2.54	3.07	.09	210
21	Kohap	3.65	3.12	2.52	.03	590
22	Haitai	3.40	2.95	2.72	.04	658
23	New Core	2.80	2.59	1.83	.02	1224
24	Anam Industrial	2.64	2.18	1.98	.01	478
25	Hanil	2.63	2.23	1.30	−.12	563
26	Sammi	2.52	2.59	1.49	−.25	3245
27	Sinho Jaeji	2.13	1.71	1.22	−.01	490
28	Bongil	2.03	1.83	0.87	−.09	921
29	Dongguk Muyok	1.62	1.36	1.07	−.02	588
30	Hansin Kongyong	1.33	1.15	1.06	.00	649

Source: Chosun Ilbo, November 27, 1997.

Notes: The ordering is based on total assets. After Asian financial crisis occurred, (4) Daewoo, (6) Ssangyong, (7) Kia, (12) Halla, (14) Donga Construction, (18) Jinro, (20) Dongguk Jaekang, (22) Haitai, (23) New Core, (26) Sammi, (27) Sinho Jaeji, and (30) Hansin Kongyong had been bankrupted or in the insolvency state by the end of 1999.

amount increased more than six times over 1991–1997. Putting these numbers in perspective, the total amount of loans in 1997 provided by just EIB was more than 10% of the government budget and almost 1% of the entire GDP of the Korean economy. A more striking observation is that the top four chaebols (Hyundai, Samsung, Daewoo, and Lucky Goldstar) together borrowed more than half of total amount of loans provided by EIB, showing a strong financial collusion between these largest chaebols and the EIB. Even more surprisingly, the percentage of loans provided by EIB to three large chaebols in the state of bankruptcy or insolvency (Daewoo, Halla, and Kia) rose from 15.0% in 1995 to 23.6% in 1996, just before the crisis, and dropped only back to approximately the 1995 level (14.4%) at the end of 1997 right after the crisis.

In summary, the evidence suggests that in view of the lending relationship between large chaebols and NBFIs, (i) the overlending problem in Korea prior to the crisis was severe; (ii) such excessive loans were provided to fund investment projects of low returns; and (iii) the absence of an effective financial supervisory and regulatory system to guide the operations of NBFIs, which in conjunction with

TABLE 5
Composition of Loans in the EIB (in billion won and %)

Chaebol	1991	1992	1993	1994	1995	1996	1997	1998
Total loans	1,284.8 (100.0)	1,294.6 (100.0)	2,340.6 (100.0)	3,031.5 (100.0)	4,178.5 (100.0)	5,022.5 (100.0)	7,540.2 (100.0)	6,724.6 (100.0)
Hyundai	282.8 (22.0)	263.9 (20.4)	308.9 (13.2)	431.0 (14.2)	633.8 (15.2)	891.9 (17.8)	1,737.7 (23.1)	1,956.6 (29.1)
Samsung	68.4 (5.3)	113.9 (8.8)	741.1 (31.7)	1,066.6 (33.2)	1,040.0 (24.9)	636.5 (12.7)	991.0 (13.1)	629.4 (9.4)
Daewoo	369.9 (28.3)	283.2 (21.9)	353.3 (15.1)	353.3 (11.7)	506.2 (12.1)	915.2 (18.2)	738.7 (9.8)	1,138.0 (16.9)
Lucky Goldstar	14.7 (1.2)	32.0(2.5)	324.6 (13.9)	426.4 (14.1)	571.5 (13.7)	446.6 (8.9)	484.9 (6.4)	298.2 (4.4)
Sunkyung	—	—	—	—	76.0 (1.8)	43.9 (0.9)	40.5 (0.5)	—
Kia	—	—	—	—	27.1 (0.7)	122.5 (2.4)	116.9 (1.6)	162.4 (2.4)
Kumho	—	3.6 (0.3)—	4.0 (0.2)—	2.3 (0.1)	8.5 (0.2)	14.5 (0.3)	19.1 (0.3)	34.3 (0.5)—
Daelim	—	18.3 (1.4)	174.6 (7.5)	166.9 (5.5)	96.6 (2.3)	228.8 (4.6)	419.3 (5.6)	203.6 (3.0)
Halla	4.7 (0.4)	14.1 (1.1)	5.9 (0.3)	32.5 (1.1)	91.8 (2.2)	144.8 (2.9)	228.4 (3.0)	4.5 (0.1)
Kolon	3.0 (0.2)	—	—	—	1.0 (0.02)	5.8 (0.1)	58.9 (0.8)	44.2 (0.7)
Dongguk Jaekang	—	—	—	2.7 (0.1)	7.7 (0.2)	3.5 (0.1)	28.9 (0.4)	22.4 (0.3)
Hanil	0.4 (0.03)	7.0 (0.5)	2.4 (0.1)	—	—	—	—	—
Hanjin	—	7.0 (0.5)	45.5 (1.9)	15.3 (0.5)	17.9 (0.4)	—	—	—
Poongsan	—	—	—	24.5 (0.8)	23.5 (0.6)	38.5 (0.8)	43.6 (0.6)	6.3 (0.1)
Hankuk Tire	—	4.3 (0.3)	3.4 (0.1)	4.7 (0.2)	—	15.1 (0.3)	39.2 (0.5)	45.7 (0.7)
SKC	—	—	—	—	—	—	—	333.5 (5.0)
Hankuk Heavy Ind.	7.1 (0.6)	7.4 (0.6)	48.7 (2.1)	169.2 (5.6)	296.9 (7.1)	156.5 (3.1)	250.2 (3.3)	112.9 (1.7)
Korean Electricity	114.7 (8.9)	117.6 (9.1)	137.4 (5.9)	130.1 (4.3)	77.5 (1.9)	59.1 (1.2)	30.9 (0.4)	34.0 (0.5)
Other Chaebol	422.4 (32.9)	422.3 (32.6)	190.8 (8.2)	266.5 (8.8)	702.5 (16.8)	1,299 (25.9)	2,310 (30.6)	1,698.6 (25.3)

Source: EIB.

a less-than-transparent institutional legal arrangement for political lobbying, encouraged crony capitalism.

C. From Theory to Practice

Upon understanding that an important underlying driving force of Korea's financial crisis occurred in 1997, we now turn to illustrating the relationship between collusion and overlending. To establish the connection between overinvestment and collusion in a convincing manner, we must answer three questions. First and most naturally, what causes overlending? One may summarize two main sources in developing countries: (i) collusion between borrowing entrepreneurs and opportunistic politicians, which is the focus of the present study (in addition to the Korean case considered here, the reader is also referred to empirical documentation by Fishman, 2001, for the case concerning the political connection with President Suharto in Indonesia) and (ii) weak corporate governance with expropriation by managers (e.g., see alleged incidents provided by Johnson et al, 2000, for the cases of the Sinar Mas Group in Indonesia, the Hyundai Group in Korea, and the Bangkok Bank of Commerce in Thailand).

The second question to raise is why overlending has not been noticeably harmful for the Korean macroeconomy prior to the crisis. Although the problem was expedited by the liberalization of the capital account when financial institutions had funds channeled in from abroad, excessive investments had coexisted with Korea's good economic performance for a long time and may thus likely be a feature of equilibrium outcome in Korea. Our study attempts to explain the emergence of this type of equilibrium based on economic primitives. Finally, the third question is: before overlending becomes a serious problem as the economy deteriorates, why has this not been fixed over such a prolonged period of time? After all, the deterioration we saw in the case of Korea is not a sudden but a gradual one. This surely demands further explanations.

Can the theory developed in this paper shed light on identifying probable causes of the 1997 Korean financial crisis and addressing the three questions raised above? In particular, we inquire (i) whether financial crisis happened in Korea in the late 1990s is possibly a result of transition from collusion to no-collusion equilibria and (ii) should this be possible, which parameter shifts are more likely to be the underlying driving forces. Concerning the second question, a decrease in π or α in theory would be the sources but is implausible in practice as one would not expect the fraction of more efficient chaebols or the fraction of honest politicians to drop suddenly. If we use the interest rate of government bonds as a proxy of the riskless rate of returns (B), it actually went down, which suggests that the collusion equilibrium becomes more stable according to our model. A possible candidate is a decrease in p. If the quality of investment opportunities deteriorates, the initial collusion equilibrium may then become unsustainable. Our theory suggests that with overlending, the combination of noticeable gradual deterioration in fundamentals (as indicated by real GDP growth in Figure 5, as well as other real variables such as employment and labor productivity) and expectations of a discrete equilibrium shift can trigger financial turmoil even before the actual equilibrium shift takes place, thereby providing a plausible explanation for the case of Korean crisis.

VI. CONCLUDING REMARKS

What caused the 1997 financial crisis in Korea? In this article, we argue that the overinvestment problem caused by collusion between chaebols and politicians is a major driving force of such a financial turmoil. How does this problem cause a widely spread financial crisis to arise suddenly?

To be more specific, financial institutions choose not to deter the collusion between low-type borrowing chaebols and loan-performance proctors when the economic environment is good. When the economic environment deteriorates in such a way that all agents observe, collusion equilibrium becomes unsustainable and the new equilibrium outcome must feature no collusion. The combination of such continuous but noticeable deterioration in fundamentals and the expectations of a discrete equilibrium shift together can trigger aggressive speculative attacks and passive withdrawals of investments from Korea even before the actual equilibrium shift takes place.

The model framework is far more general than it appears—one can easily apply it to cases with the politician replaced by an auditor or a bank loan officer who has different objective from the bank owner. While the former application is straightforward, the latter deserves further comments. Specifically, the objective of bank owners is to maximize profit, whereas that of bank loan officers is to maximize expected income inclusive of bribes from borrowing firms, as studied by Wu (2003). One may consider a repeated game in which the bank owner demotes or dismisses the loan officer when the realized output reveals the presence of false assessment of borrowers' types. Under this environment, one may examine the relationship between the duration of the financial contract and the severity of financial collusion. Another application is to consider depositors as principals, bank managers as supervisors, and government bureaucrats as agents who are undertaking public investment projects. This may contrast with the two-layer principal-agent model developed by Banerjee (1997) to study the issue of misallocation of funds and misgovernance.

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