Universal Banking and Corporate Governance

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The paper analyzes implications of universal banking for corporate governance through its impact on banks' monitoring incentives. It also formalizes the idea that a financial conglomerate may engage in commercial banking activities to strengthen its position in investment banking. The investment banking sector is characterized by supra-normal profits that cannot be competed away due to incentive problems inherent in the security underwriting business. Universal banking serves as a mechanism to capture rents in the investment banking sector by providing discounts in commercial banking. This practice has an adverse effect on commercial banks' monitoring incentives and thus induces entrepreneurs to pursue private rents to a greater extent. The effects of universal banking on overall welfare are also analyzed.

Keywords: universal banking, commercial banking, investment banking, corporate governance, moral hazard
JEL Classification Number: G2, G3, L1

I. Introduction

The paper analyzes implications of universal banking for corporate governance through its impact on banks' monitoring incentives. The motivation for this study comes from the relaxation of the Galss-Steagall restrictions on bank underwriting in the US during the 1990s and the Financial System Reform Act of 1993 in Japan that allowed commercial banks to underwrite securities. In particular, this paper analyzes the interplay between commercial and investment banking activities to formalize the idea that a financial conglomerate may engage in commercial banking to strengthen its position in investment banking. Bankers and company executives often comment that lenders want to snatch business from investment banks because underwriting stocks and bonds is more profitable than making loans.[2] We construct a model that formalizes such an idea often expressed in the popular press and analyze the implications of such practices for corporate governance and social welfare.

The investment banking sector is characterized by supra-normal profits that cannot be competed away due to incentive problems inherent in the security underwriting business. We argue that engaging in commercial banking activities through universal banking provides a channel to cross subsidize across sectors to secure lucrative profits in the investment banking sector. This mechanism provides unilateral incentives to form a financial conglomerate if the legal framework allows as in the case of the repeal of the

[2] For instance, Peter Hong, treasurer of Ingersoll-Rand Co., says "Banks continue to say that credit lines are loss leaders and so they need other business to compensate." See Lake and Urban (2002).

depression era Glass-Steagall Act in 1999. In equilibrium, however, all investment banks establish commercial bank divisions, and any advantage that can be enjoyed with a unilateral move towards universal banking is neutralized. The main result is that commercial banks' monitoring incentives in a universal banking system are lower than those in a financial system in which commercial and investment banks are functionally separated. The overall welfare effects of the universal banking system are ambiguous and depend on whether the monitoring effort by the commercial banks under a functionally separated banking system is excessive or insufficient. If these efforts are insufficient to begin with, the universal banking system is unambiguously welfare-reducing since it exacerbates the monitoring problem. Otherwise, it could mitigate the inefficiency associated with the monitoring incentives and be welfare-enhancing.

It appears that since the passage of the Gramm-Leach-Bliley Act in 1999, which removed most barriers between U.S. commercial and investment banking, financial conglomerates have gained significant ground in the investment banking market.[3] Two good examples of financial conglomerates are Citigroup and JP Morgan Chase. Furthermore, in the United Kingdom since the formation of financial conglomerates was allowed in 1986 most pure investment banks have merged with commercial banks.[4]

[3] According to the Thomson Financial global M&A or global underwriting rankings, U.S. and foreign financial conglomerates either improved or maintained their rank in the period from 2000 to the first half of 2002. The Thomson Financial rankings are based on global market shares (Thomson Financial [June 28, July 2, 2002]).

[4] In the United Kingdom, separation between commercial and investment banks was the result of self-regulation within the London Stock Exchange rather than formal government regulation. The barriers between investment and commercial banking collapsed when the Big Bang occurred in 1986. Notably, since 1986 most pure investment banks have merged with commercial banks. From the 29 sizable pure

Some strategists believe that a main reason for the conglomerates' success is their use of lending relationships for the advancement of investment banking products (Economist [2002]). Our paper formalizes the discussion by illustrating a mechanism of cross subsidy between commercial and investment banking and makes predictions broadly consistent with empirical observations. Drucker and Manju's (2003) empirical research, for instance, finds that a tied loan increases the probability of receiving the underwriting business and firms benefit from discounted loan yields.

Our paper is closely related to Kanatas and Qi [2003] in that both papers address implications of universal banking for resource allocations and incentives to integrate bank lending and underwriting businesses. However, there are at least three major differences between the two papers. First, in Kanatas and Qi [2003], all main results are driven by the assumption of informational scope economies. More specifically, a financial conglomerate needs to incur a fixed cost to establish a relationship with a client. This cost does not have to be re-incurred if the same client obtains loans or securities underwriting services from the conglomerate in the future. As a result, universal banks' ability to offer "one-stop shopping" for lending and underwriting enables them to "lock in" their clients subsequent business and exercise *ex post* market power. This implies that universal banks will have less incentive to provide the costly efforts that will aid the successful marketing

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investment banks that were in the market in 1986, only 2, Rothschilds and Cazenove, continue to operate in 2002, while only 4 have merged with pure investment banks, i.e., with Merrill Lynch and Lehman Brothers. Twenty-one of the remaining investment banks have become divisions of financial conglomerates (Smith and Walter [2003]).

of their clients' securities because they know that they will still be able to profitably serve their clients' credit needs in case their underwriting efforts fail.

Our model also predicts reduced underwriting efforts due to universal banking. However, our mechanism is based on the supra-normal profits that cannot be competed away due to incentive problems inherent in the security underwriting business. The universal banks' ability to cross subsidize across business units provides another channel to compete for the lucrative underwriting business through tying. In our model, the reduced lending rate below the equilibrium level that would have prevailed under a functionally separated banking system implies lower monitoring incentives. This in turn has an adverse effect on investment banks' incentives in the underwriting businesses due to monitoring externalities across projects. Second, in Kanatas and Qi [2003], loans and securities underwriting are substitute products such that a client may raise capital through either product. In contrast, we assume that they are complementary and serve different purposes in the course of long-term projects. Finally, Kanatas and Qi present a model of adverse selection where the role of both types of banks is to identify "good" projects from "bad" ones. In contrast, our paper is based on moral hazard in which the commercial banks' main role is to monitor entrepreneurs' pursuit of private rents. Overall, the two papers emphasize different channels through which universal banking affects competition in the direct banking and underwriting sectors and should be viewed as complementary.

Puri (1999) also addresses the question of how the entry of commercial banks into the securities market will affect underwriting activities. However, her main focus is on the implications of underwriter type for pricing and is not concerned with the issue of

corporate governance. In addition, her model deals with the problem of adverse selection whereas our model is mainly concerned with the moral hazard problem of entrepreneurs. In other words, the main role of the bank in her model is as a certifier. In contrast, we emphasize monitoring as the main role of commercial banks.

Greenbaum, Kanatas and Venezia [1989], Sharpe [1990], Von Thadden [2001] and Marquez [2002] examine the role of long-term client relationships in commercial banking.[5] These papers show that the ability of a commercial bank to obtain proprietary information on its clients gives the bank an informational advantage over rival banks in the future when former borrowers seek to secure new loans. The presence of asymmetric information reduces future competition in commercial banking, allowing a bank to earn excess profits when it grants new loans to former borrowers.[6] Unlike this body of literature, which analyzes the role of client relationships within the commercial banking sector, our paper focuses on the use of lending relationships to improve a financial institution's position in investment banking.

On the empirical front, Kroszner and Rajan [1994] evaluate the rationale behind the Glass-Steagall Act that conflicts of interest may arise when a bank combines lending and underwriting. For instance, when a borrowing firm has an adverse shock and it is private information the bank may have incentives to fool the public into investing in securities and use the proceeds to repay earlier bank loans made to the firm. Kroszner and Rajan

[5] Rajan [1992] shows that one of the costs of lending relationships is the bargaining power of banks over firms' profits once projects have begun.

[6] In a competitive market, commercial banks may lend to new firms at overly generous interest rates to capture the firms informationally and earn excess profits in the future.

[1994] test this "naïve investor" hypothesis by comparing the relative performance of securities underwritten by affiliates of commercial banks vis-à-vis those underwritten by pure investment banks. They use data for the US experience prior to the Glass-Steagall Act and find no evidence that universal banks systematically fooled the public securities markets.[7]

The remainder of the paper is organized in the following way. In section II, we lay out the basic model that describes the environment in which entrepreneurs and financial firms are operating. Section III analyzes market equilibrium in the investment banking and commercial banking sector, respectively, when investment and commercial banking firms are functionally separated. Section IV analyzes market equilibrium in a universal banking system. We investigate the equilibrium financial market structure and welfare implications in section V. Concluding remarks are contained in section VI.

[7] Puri (1996) also examines empirically the "conflict of interest effect," arising from banks' incentives to misuse private information gained through their lending activities. She finds that this effect is small and rational investors anticipate it, which is consistent with Kroszner and Rajan (1994). White (1986), in contrast, addresses a macroeconomic question of whether integration of lending and underwriting increases the riskiness and stability of the financial system. His empirical study of bank failures in the 1920's finds that direct involvement of commercial banks in the securities business did not impair the stability of the financial system prior to Glass-Steagall.

Ⅱ. The Model

Our model consists of four classes of agents who are entrepreneurs, commercial banks, investment banks, and outside investors. All agents are assumed to be risk neutral and the riskless interest rate is zero. An entrepreneur has a risky, long-term project that needs to be funded. We normalize the cost of the project to \$1. The entrepreneur does not have sufficient funds to initiate the project and has to finance from outside sources.

The entrepreneur is subject to a moral hazard problem. More specifically, once the project is funded, the entrepreneur has an option to seek private rent R_1 at the expense of the banks/outside investors who financed the project. This option can be considered as asset-substitution moral hazard to seek a control rent as in Boot and Thakor (1997) and O'Hara (1993). If the entrepreneur carries out the project without pursuing private rents, the project is successful and yields a payoff of x with probability γ. With the complementary probability of $(1-\gamma)$, the project fails with a payoff of 0. Thus, the failure of the project is not foolproof evidence of moral hazard on the part of the entrepreneur. If the entrepreneur pursues private gains, the project yields 0 with probability 1.[8] We assume that the outcome of the project is verifiable and can be contracted upon.

[8] The model is easily generalized such that the project yields a payoff of x with probability γ' and fails with a payoff of 0 with the complementary probability of $(1-\gamma')$ when the entrepreneur pursues his private gain, where $\gamma'<\gamma$, without affecting any major results.

The commercial banks in our model specialize in monitoring activities to prevent the entrepreneur's moral hazard problem.[9] The monitoring is costly, however. We assume that post-lending asset-substitution moral hazard can be avoided with probability θ if commercial banks engage in monitoring activities with the cost of $C_M(\theta)$, where $C_M'(\theta)>0$ and $C_M''(\theta)>0$. Bank's monitoring activities are not contractible because a bank's monitoring expenditures are either unobservable or non-verifiable in courts. As a result, a bank's monitoring incentives should be sequentially rational and rely on the repayment obligation of the entrepreneur stipulated in the commercial loan contract. We assume that an entrepreneur's contracting with a commercial bank is publicly observable, implying that third parties can infer the level of monitoring activities (θ) by the commercial bank.

Investment banks do not have the capability to monitor entrepreneurs. Instead, the role of investment banks in our model is to underwrite securities to sell to outside investors in order to finance projects.[10] This implies that investment banks will not be able to underwrite securities to finance the entrepreneur's initial project since the entrepreneur will always pursue private rents without any monitoring and thus the project will always fail. The necessity for initial reliance on commercial banks is important in our model.

In the course of the initial project but before the payoff of the initial project is realized, there arises an additional market opportunity that can enhance the payoff of the

[9] See Diamond (1984) for a model of financial intermediation as delegated monitoring.

[10] Outside investors do not have monitoring capabilities either because they do not have access to the entrepreneurial firm's internal records. Even if they are able to examine the accounting books, the size of each outside investor's stake is too small to justify private monitoring, leading to a free-rider problem.

initial project. This supplementary project costs $*K*. As in the original project, the entrepreneur faces the same type of moral hazard opportunity in that with additional funding he can engage in an asset substitution activity that generates a private rent of R_2. If there is no asset substitution by the entrepreneur, the supplementary project is successful and yields an additional payoff of y with probability λ. With the complementary probability of $(1-\lambda)$, the project fails with a payoff of 0. For simplicity, we assume that the success of the additional project is independent of the success of the original project. If the entrepreneur pursues his private gain, the second project yields 0 with probability 1.

However, there is interdependency between the two projects due to the *monitoring externality* across projects. In particular, we assume that the monitoring of the entrepreneur in his pursuit of private rents in one project also deters the same type of behavior in the other project. For instance, the entrepreneur may not engage in an asset substitution activity in only one project independently of the other. As a result, if commercial banks monitor the entrepreneur, there are positive spillover effects if investment banks finance the second project.

In fact, we envision a situation in which the second supplementary project is financed by outside investors through the underwriting of investment banks even if we do not fully develop a model in which such a financing arises endogenously. One approach to build such a model would be along the lines suggested by Boot and Thakor (1997). More specifically, imagine a capital market populated by traders who may have information relevant to the supplementary investment decisions of the firm that may not

be available to the entrepreneur.[11] With dispersed information among traders and the entrepreneur, one important role of the capital market is to aggregate this dispersed information among traders and reveal the information to the entrepreneur. In such a case, the role of investment bank is to engage in security design innovation that improves the information sensitivity of the securities offered by the firm as in Boot and Thakor (1993, 1997).

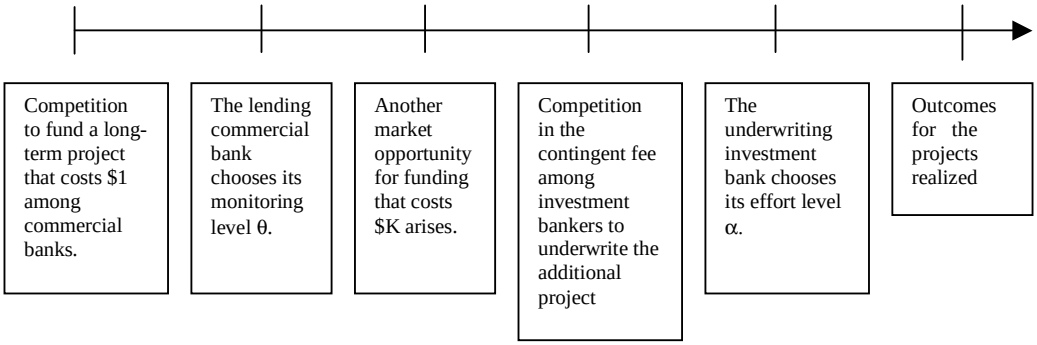
Taken together, our assumptions imply that the initial project is financed by commercial banks whereas the additional project is financed by outside investors via investment banks' underwriting.[12] This scenario is consistent with Diamond (1991), Fama (1985), Kanatas and Qi (1998), Rajan (1992), and Sharpe (1990) who suggest that difficulties for start-up firms to access the security markets in the beginning, but once established, they prefer security issues to a continued use of bank loans. The sequence of the events is depicted in Figure 1.[13]

[11] See Boot and Thakor (1997) for justifications of this assumption.

[12] Our model thus differs from Kanatas and Qi (2003) and Boot and Thakor (1997) in that we analyze complementary aspects of financing between commercial and investment banks rather than view them as alternative and competitive sources of financing.

[13] Kanatas and Qi (2003) employ the opposite sequence in the order of tapping outside financing. In their model, direct lending and security underwriting are alternative ways of financing the same project. In addition, they assume that the role of both commercial and investment banking is to uncover the quality of the potential project. Since they assume that commercial banks have the capability to identity the type of the project without any mistake whereas the investment banks receives a noisy signal (but at a lower cost) the entrepreneur will never approach investment banks after failing to have its project approved by commercial banks. However, if the entrepreneur decides to try financing from capital market investors first and the investment banking firm's underwriting efforts fail due to its inability to receive a positive signal, he can go to commercial banks for another try.

<Figure 1> **Time Line and Sequence of Events**



III. Competition in a Functionally Separated Banking System

As usual, we apply a backwards induction argument and analyze the financing of the supplementary project first to derive the overall market equilibrium.

1. Competition in the Investment Banking Sector

Suppose that the financial contract between a commercial bank and the firm induces the commercial bank to monitor the entrepreneur with θ. The investment banks compete for the business of underwriting at a fee of μ. We assume that the success of capital market financing depends on the investment bank's efforts. More specifically, the probability of successful public offering of the firm's securities α can be achieved with the cost of $C_U(\alpha)$, where $C_U'(\alpha)>0$ and $C_U''(\alpha)>0$. We can interpret α as the probability of successful security design by the investment bank that allows aggregation of dispersed information held by outside investors concerning the supplementary project. As in Kanatas and Qi (2003), the firm is obligated to pay the underwriting fee only if the investment bank is successful in the public offering. We assume that the investment banks' effort level that induces α cannot be contracted upon. Thus, the only way to provide investment banks incentives to exert effort is through the contingent fee μ.

Given the underwriter fee μ, the investment bank will choose α to solve

$$\underset{\alpha}{Max}\ \alpha\mu - C_U(\alpha). \qquad (1)$$

The optimal level of α for the investment firm depends on the contingent fee μ and is given by the first-order condition $C_U'(\alpha) = \mu$, which implicitly defines $\alpha(\mu)$ that is increasing in μ.[14]

Let us assume that there are two investment banking firms, which we call IB1 and IB2, competing for the underwriting business in the Bertrand fashion. For incentive compatibility reasons, we further assume that investment banking firms can compete only in terms of *contingent fee* and cannot offer an up-front lump-sum payment to the entrepreneur in an attempt to secure underwriting business. If such payments are allowed, the entrepreneur will have an incentive to obstruct successful design of securities, perhaps by withholding critical information, in an attempt to pocket the lump-sum payments and engage in another round of bidding for the underwriting business.

Bertrand competition between investment banks implies that they compete in terms of μ to maximize the firm's expected payoff for the additional project, *given* the level of monitoring θ provided by the commercial bank.

$$\underset{\mu}{Max}\ \alpha(\mu)[\ \theta\lambda(y - r_I\ ) + (1-\theta)\ R_2\ ], \qquad (2)$$

[14] Totally differentiating the first order condition (1) yields $C_U''(\alpha)d\alpha = d\mu$, which implies that $d\alpha/d\mu = 1/C_U''(\alpha) > 0$.

where r_I is the rate of return to be paid to outside investors when the second project is successful. With the project cost of K and contingent fee of μ, the amount of funding the firm needs from its security issue is $K + \mu$. Having a competitive capital market implies that the security will be priced at $r_I = (K+\mu)/\theta\lambda$ to outside investors if the contract between the commercial bank and the entrepreneur induces monitoring effort of θ.[15] Thus, the problem for investment banks can be written as

$$\underset{\mu}{Max}\ \alpha(\mu)[\ \theta\lambda y - (K + \mu)\ + (1-\theta)\ R_2\ ]. \qquad (3)$$

We assume that $\lambda y > R_2$, which implies that the entrepreneur's pursuit of private rents R_2 is socially inefficient. The following first order condition defines the equilibrium contingent fee $\mu^* = \mu(\theta)$ as a function of θ:

$$\alpha'(\mu)[\ \theta\lambda y - (K + \mu)\ + (1-\theta)\ R_2\ ] - \alpha(\mu) = 0. \qquad (4)$$

By totally differentiating the first order condition (4), we can derive

$$\frac{d\mu^*}{d\theta} = -\frac{\alpha'(\mu)[\lambda y - R_2]}{[second\quad order\quad condition]} > 0, \qquad (5)$$

[15] Notice that due to the monitoring externality outside investors demand a higher rate of return with less monitoring by the commercial bank.

where the sign of [*second order condition*] is negative. That is, the contingent fee increases with the monitoring level. The intuition is that with increased level of monitoring, the supplementary project becomes more valuable and the importance of successful underwriting is enhanced.

We assume that at the contingent fee $\mu*=\mu(\theta)$ that maximizes the entrepreneur's expected payoff the investment banks make a positive profit, that is,

$$\rho(\theta) = \alpha[\mu(\theta)]\mu(\theta) - C_U(\alpha[\mu(\theta)]) > 0, \qquad (6)$$

where $\rho(\theta)$ is the investment bank's profit function.[16]

Let us assume that each firm has an equal chance of receiving the underwriting business when both firms make the same offer. Then both firms bid the contingent fee of $\mu*=\mu(\theta)$ for the underwriting business and each investment bank will get the expected payoff of $\rho(\theta)/2$.[17] Even though we assume Bertrand competition with homogeneous services each investment bank gets positive profits due to the inability to write a complete contract contingent on the effort levels of investment banks.

It is a well-established fact that underwriting stocks and bonds is much more lucrative than making loans. Hayes and Spence (1983) and Pugel and White (1985), for instance, provide evidence that securities firms have market power in the United States.

[16] In this respect, we depart from Kantanas and Qi (2003) who assume that the nonnegative profit condition for investment banks is binding. In our model, the rent for investment banks which cannot be competed away plays a crucial role in making cross-subsidy possible in the universal banking system.

According to comments made by bankers and company executives, banks typically collect fees of as little as 0.1 percent for arranging credit lines whereas they collect fees of about 0.5 percent from underwriting investment-grade corporate bonds, commissions of about 2.5 percent from selling new junk bonds and the fees of as much as 7 percent from initial stock offerings. It has been a puzzle why such a large difference exists and why lucrative fees in the investment banking sector are not competed away.[18] Our model provides an explanation for the huge discrepancy in profits between commercial and investment banking sectors.[19]

We have analyzed the equilibrium in the investment sector when commercial banks monitor the entrepreneur with intensity θ. We now show that a positive monitoring externality exists such that a higher level of monitoring by commercial banks increases both the entrepreneur's and investment banks' profits from the supplementary project.

Let us define $\Psi(\theta)$ as the entrepreneur's expected profit from the additional project, that is, $\Psi(\theta) = \underset{\mu}{Max}\ \alpha*(\mu)[\ \theta\lambda y - (K + \mu) + (1-\theta)\ R_2\ ]$.

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[17] More generally, if there are N investment banking firms each firm bids the same contingent fee of $\mu*=\mu(\theta)$ for the underwriting business and each investment bank will get the expected payoff of $\rho(\theta)/N$.

[18] According to Rajan (1995), "[t]he important question that is often left unasked is why these alleged excess profits exist in investment banking."

[19] A standard explanation relies on barriers to entry into the investment banking sector such as the importance of reputation in the certification function performed by underwriters (Beatty and Ritter, 1986), set-up costs in firm-financial intermediary relationships (James, 1992) and the importance of networks of investers (Benveniste and Spindt, 1989). With Bertrand competition, however, it takes only two firms to have a competitive market outcome, and entry barriers do not play a role in the determination of the market outcome. In our model, the supra-normal profits are due to agency problems, and the source of these profits cannot be driven away by more entry.

Proposition 1. $\Psi(\theta) = \dfrac{\{\alpha[\mu(\theta)]\}^2}{\alpha'[\mu(\theta)]}$, $\Psi'(\theta) > 0$, and $\rho'(\theta) > 0$.

Proof. By the definition of $\mu(\theta)$,

$$\Psi(\theta) = \underset{\mu}{Max}\ \alpha(\mu)[\ \theta\lambda y - (K + \mu) + (1-\theta)\, R_2\ ]$$

$$= \alpha[\mu(\theta)][\ \theta\lambda y - [K + \mu(\theta)] + (1-\theta)\, R_2] = \frac{\{\alpha[\mu(\theta)]\}^2}{\alpha'[\mu(\theta)]}. \qquad (7)$$

The last equality holds due to the first order condition (4). A simple application of the envelope theorem also yields that $\Psi'(\theta) = \alpha[\mu(\theta)][\ \lambda y - R_2] > 0$ and $\rho'(\theta) = \alpha[\mu(\theta)]\mu'(\theta) > 0$.

Proposition 1 implies that there is a monitoring externality in that more monitoring effort by the commercial bank also increases the entrepreneur's payoff from the *additional* project even if it is financed by an investment bank.

2. Competition in the Commercial Banking Sector

Consider the financing of the initial project that requires \$1. When the entrepreneur is not engaged in an asset substituting activity, the project will succeed with the

probability of γ. This implies that for outsiders who finance the project, the return in case of success cannot be less than $1/\gamma$. We assume that $R_1 > \gamma x - 1$, which implies that the entrepreneur prefers to pursue his/her private gains R_1 by engaging in an asset substituting activity in case of outside financing. As a consequence, we can conclude that the only way for the initial project to be financed is through commercial banks that specialize in monitoring. Let r_B be the rate of return to be paid to commercial banks when the project is successful. We assume that the monitoring level by commercial banks is not verifiable in court and thus cannot be included in contracts between the entrepreneur and commercial banks. A contract specifies repayment in case of project success, and the only instrument with which commercial banks compete is the loan payback rate r_B. The cost of monitoring is given by $C_M(\theta)$,where $C_M'(\theta)>0$ and $C_M''(\theta)>0$. Given the payback rate of r_B, the commercial bank chooses the monitoring level to solve the following problem.

$$\underset{\theta}{Max}\ \theta\gamma r_B - C_M(\theta) \qquad (8)$$

The first order condition $\gamma r_B - C_M'(\theta) = 0$ implicitly defines the optimal level of monitoring $\theta^* = \theta(r_B)$ as a function of r_B. By totally differentiating the first order condition, we can easily verify that the monitoring level is increasing in r_B:

$$\frac{d\theta^*}{dr_B} = \frac{\gamma}{C_M''} > 0$$

As in the investment banking sector, we assume that there are two commercial banking firms, called CB1 and CB2, competing in direct lending. In a functionally separated banking system, these commercial banks are independent entities from investment banks. Commercial banks compete in loan rates r_B to maximize the entrepreneur's expected payoff, taking into account that the loan rate determines the bank's ex post monitoring rate which affects the probability of repayment for the current loan and expected rents from a supplementary project opportunity that arises later. Let $\Pi(r_B)$ be the expected overall payoff for the entrepreneur when the bank loan rate is r_B , i.e., $\Pi(r_B) = \theta(r_B)[\gamma(x - r_B)] + [(1 - \theta(r_B)]R_1 + \Psi[\theta(r_B)]$. Then, the commercial bank competition leads to the following outcome:

$$\underset{r_B}{Max}\ \Pi(r_B) = \theta(r_B)[\gamma(x - r_B)] + [(1 - \theta(r_B)]R_1 + \Psi[\theta(r_B)]$$

subject to

$$\theta(r_B)\,\gamma\, r_B - C_M[\theta(r_B)] - 1 \geq 0,$$

where the constraint in the maximization problem represents the nonnegative profit condition for commercial banks.

To facilitate our analysis, we assume that the entrepreneur always prefers to borrow money at a lower payback rate even though it may adversely affect the expected rents from the subsequent project through the terms of financing in the capital market.

(A1) $\Pi'(r_B) = -\theta(r_B)\gamma + \theta'(r_B)\{[\gamma(x - r_B)] - R_1 + \Psi'[\theta(r_B)]\} < 0$ for all $r_B \geq 1/\gamma$.

The first term on the right hand side of the assumption ($-\theta(r_B)\gamma$) is the direct effect of an increase in the loan rate on the entrepreneur's expected profit and the second term is the indirect effect through the commercial bank's monitoring effort.

Proposition 2. Under assumption (A1), the equilibrium commercial bank loan rate r_B^* is the lowest rate that satisfies the nonnegative profit condition for commercial banks. That is, $r_B^* = \bar{r}_B$, where $\bar{r}_B$ ($> 1/\gamma$) is the unique r_B that satisfies $\Gamma(r_B) = \theta(r_B)\gamma r_B - C_M[\theta(r_B)] - 1 = 0$.

Proof. Under assumption (A1), the entrepreneur will choose the bank that offers the lowest payback rate r_B. Define $\Gamma(r_B) = \theta^*(r_B)\gamma r_B - C_M[\theta^*(r_B)] - 1$ to be the expected payoff of commercial banks with a loan rate of r_B. We have $\Gamma'(r_B) = \theta^*(r_B)\gamma > 0$ by the envelope theorem. We know that $\Gamma(1/\gamma) < 0$. Taken together, we can conclude that there is a unique $\bar{r}_B > 1/\gamma$ such that $\Gamma(\bar{r}_B) = 0$, which is the equilibrium loan rate that maximizes the entrepreneur's expected payoffs with the nonnegative profit constraint for commercial banks binding.

Let us further assume that the joint profit of the entrepreneur and the commercial bank that provides the initial loan, $[\Pi(r_B) + \Gamma(r_B)]$, is concave in r_B and achieves its maximum at r_B^J. Then, we have the following result.

Proposition 3. From the collective viewpoint of the entrepreneur and the commercial bank, competition leads to under-monitoring if $R_1 < \gamma(x - \bar{r}_B) + \Psi'[\theta(\bar{r}_B)]$ and to over-monitoring if the inequality is reversed.

Proof. Let us evaluate the derivative of the joint profit of the entrepreneur and the commercial bank at the market equilibrium loan rate $\bar{r}_B$. Then, we have

$$[\Pi'(r_B) + \Gamma'(r_B)]\big|_{r_B=\bar{r}_B} = \theta'(\bar{r}_B)\{[\gamma(x - \bar{r}_B)] - R_1 + \Psi'[\theta(\bar{r}_B)]\}.$$

Since the loan payback rate r_B is a transfer between the entrepreneur and the commercial bank, the only effect of the loan rate on the collective welfare of the entrepreneur and the commercial bank is through its effect on the monitoring effort of the commercial bank. With the concavity of the joint profit, whether the equilibrium loan rate is too high or too low from the collective viewpoint of the entrepreneur and the commercial bank depends on the sign of $[\Pi'(r_B) + \Gamma'(r_B)]\big|_{r_B=\bar{r}_B}$. We know that $\theta^{*\prime}(r_B) > 0$. Thus, the equilibrium loan rate is too low (i.e., $\bar{r}_B < r_B^J$), which results in under-

monitoring by the commercial bank when $R_1 < \gamma(x - \bar{r}_B) + \Psi'[\theta(\bar{r}_B)]$. If the inequality is reversed, we have $[\Pi'(r_B) + \Gamma'(r_B)]|_{r_B=\bar{r}_B} < 0$, which implies that the market equilibrium loan rate is too high ($\bar{r}_B > r_B^J$) and there is over-monitoring from the commercial bank.

IV. Competition in a Universal Banking System

In the previous section, we analyzed how the entrepreneur's projects are financed in the commercial and investment banking sectors under the assumption that commercial and investment banking sectors are populated by independent firms. This would correspond to the situation under the Glass-Stegall Act of 1933 which prohibited the involvement of commercial banks in the securities business. In this section, we analyze how competition takes place when a firm can be active in both sectors. For concreteness, let us consider a situation in which commercial bank 1 is also operating in the investment sector. The advantage of being a financial conglomerate in our model is that it allows the firm to cross-subsidize across sectors. More specifically, the firm can offer a commercial loan rate that is below the break-even rate $\overline{r}_B$ with a condition that the entrepreneur would hire the same firm for a lucrative underwriting business later. Thus, an investment bank that offers only underwriting services renders itself vulnerable to entry by a universal bank offering both commercial loan and underwriting services. This is due to the moral hazard problem in the provision of underwriting services that prevents contingent fees in the investment banking sector from being competed away.

To see the mechanism, consider a market structure in which CB1 and IB1 merger to form a universal bank (UB1) while CB2 and IB2 remain independent. Suppose that the entrepreneur seeks his financing of the original project from the independent commercial bank CB2. Then, the best loan rate the entrepreneur can get is $\overline{r}_B$ with the expected payoff of $\Pi(\overline{r}_B)$. In such a case, the commercial bank CB2 gets zero expected profit

while the investment bank IB2 and the investment division of UB1 will get expected payoffs of $\rho(\bar{\theta})/2$, where $\bar{\theta} = \theta(\bar{r}_B)$, assuming that each firm has an equal chance of receiving the underwriting business when both firms make the same offer. UB1 as a financial conglomerate, however, can simultaneously offer a better deal for the entrepreneur and boost its own profits at the expense of independent investment banking firm IB2. For instance, UB1 can offer a loan rate of $\bar{r}_B - \varepsilon$, where ε is a small positive number with an implicit promise of conferring future underwriting business to UB1.[20] With such an offer, the entrepreneur is strictly better off since $\Pi'(\bar{r}_B) < 0$. The entrepreneur strictly prefers to receive a loan for the initial project from the universal bank. With this offer, UB1's payoff in the commercial sector is lower and, in fact, makes a loss. However, this loss is more than offset by a discontinuous jump in its profit in the investment sector from $\rho(\bar{\theta})/2$ to almost $\rho(\bar{\theta})$ when ε is infinitesimal.[21] Thus, our model formalizes the idea often expressed in business press that financial conglomerates use their loans as a means to improve their position in investment banking (Beckett and Sapsford [2002], Economist [2002]).

Now consider a situation where both commercial firms are engaged in investment banking business. Call these two conglomerate firms UB1 and UB2. In such a scenario,

[20] There is no incentive for the entrepreneur to renege on this promise in the future since the entrepreneur is indifferent between UB1 and IB2.

[21] We assume that the investment banking divisions of the universal bank is not allowed to hold any securities issued by itself. This may be due to the fear that it could stuff the securities it could not sell into the trust accounts that it manages (See Benston, 1990). This implies that all securities issued by the

both firms are willing to cut the commercial loan rate up to the point where their loss is equal to their expected payoff in the investment banking sector. Let $U(r_B) = \Gamma(r_B) + \rho[\theta(r_B)]$ be the expected payoff of universal banking firms when they offer a commercial loan rate of r_B and secure the subsequent underwriting business. Then the lowest rate ($\hat{r}_B$) the universal banking firms are willing to charge in the commercial loan business with the promise of future underwriting business can be defined by $U(\hat{r}_B) = \Gamma(\hat{r}_B) + \rho[\theta(\hat{r}_B)] = 0$. Such a rate is uniquely defined since $U'(r_B) = \Gamma'(r_B) + \rho'[\theta(r_B)]\,\theta'(r_B) > 0$. We also know that $U(\bar{r}_B) > 0$ and $U(0) < 0$. Therefore, we have $0 < \hat{r}_B < \bar{r}_B$. We further define r_B^M= argmax $\Pi(r_B)$. Since we have assumed that $\Pi'(r_B) < 0$ for all $r_B \geq 1/\gamma$ (see (A1)), we have $r_B^M < 1/\gamma$.

To derive the equilibrium commercial loan rate with financial conglomerates, we need to distinguish two cases depending on the relative magnitudes of $\hat{r}_B$ and r_B^M (see Figure 2). If $r_B^M < \hat{r}_B$, competition between the universal banks to maximize the entrepreneur's surplus will lead to the loan rate $\hat{r}_B$ that dissipates all surplus from investment banking. Both universal banking firms have zero profits irrespective of who provides the commercial loan and subsequent underwriting business. In contrast, if $\hat{r}_B < r_B^M$, competition in the commercial loan rate will stop at the rate of r_B^M and the firm who wins the business will get the surplus of $U(r_B^M) > 0$. We assume that in this case the

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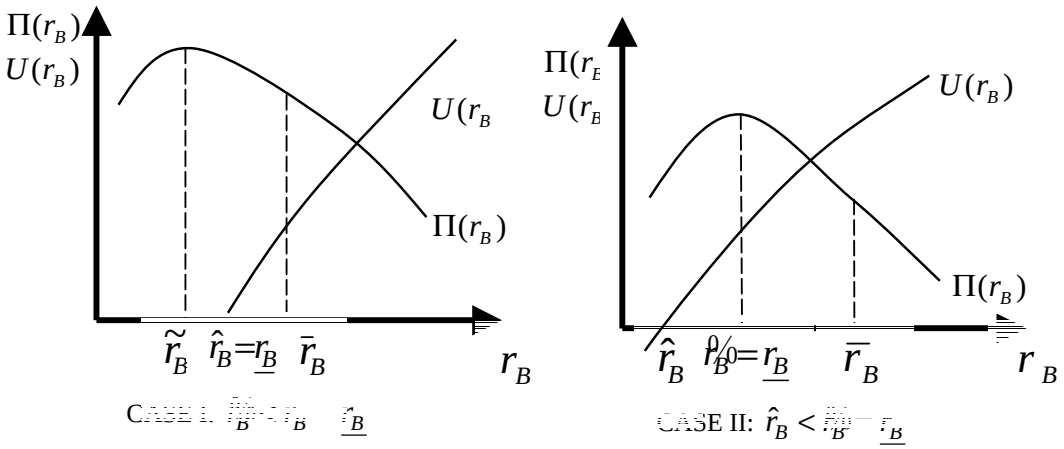
investment banking arm are held by outside investors and there is no feed back from securities issuing on the monitoring incentives of the commercial bank division.

business is given to each universal firm with equal probabilities. Thus, the expected profit of the each universal banking firm is given by U($r_B^{\wedge}$)/2. Our discussion can be summarized in the following proposition.

Proposition 4. If both firms are financial conglomerates, the equilibrium commercial loan rate $\underline{r}_B$ is given by $\underline{r}_B$ = max [$\hat{r}_B$, $r_B^{\wedge}$]. If $\underline{r}_B = \hat{r}_B$, both firms make zero expected profits. If $\underline{r}_B = r_B^{\wedge}$, the expected profits of each universal banking firm is U($r_B^{\wedge}$)/2 >0.

<Figure 2> **Equilibrium Commercial Loan Rate under Universal Banking**



CASE I: $r_B^{\wedge} \geq \hat{r}_B \geq \underline{r}_B$ CASE II: $\hat{r}_B < r_B^{\wedge} = \underline{r}_B$

V. Equilibrium Banking Structure and Social Welfare

Now we can analyze the merger incentives between commercial and investment banking firms to form a universal bank. They will form if their joint profit after the merger is larger than the sum of profits when they are independent. Let us assume that if there is a merger, CB1 and CB2 will be matched with IB1 and IB2, respectively.

Proposition 5. The equilibrium market structure is that in which all firms decide to be universal banking firms. However, the payoff structure mirrors that of the Prisoner's Dilemma, and investment banking sector profits will be competed away through cross subsidy to commercial banking when both financial firms are universal banks.

Proof. Our discussion up to now can be summarized in the following matrix that shows *combined profits* of CB1-IB1 and CB2-IB2, depending on their decisions to remain as focused firms or merge.

$CB_1 - IB_1$ \ $CB_2 - IB_2$	Focused Banking	Universal Banking
Focused Banking	$\frac{\rho(\theta^*(\bar{r}_B)}{2}, \frac{\rho(\theta^*(\bar{r}_B))}{2}$	$0, \rho(\theta^*(\bar{r}_B))$
Universal Banking	$\rho(\theta^*(\bar{r}_B)), 0$	$0, 0$ or $\frac{U(\underline{r}_B)}{2}, \frac{U(\underline{r}_B)}{2}$

Thus, it is clear that forming a universal bank is a weakly dominant strategy when $\underline{r}_B < \hat{r}_B$ and a strictly dominant strategy when $\hat{r}_B < \underline{r}_B$. Furthermore, we know that $U(\underline{r}_B) = \Gamma(\underline{r}_B) + \rho[\theta^*(\underline{r}_B)] < \rho[\theta^*(\bar{r}_B)]$ since $\underline{r}_B < \bar{r}_B$ and $\Gamma(\underline{r}_B) < 0$.

Proposition 6. When universal banking is allowed, the monitoring incentives of commercial banks are reduced in equilibrium. As a result, the entrepreneur pursues more private rent and the probability of successful underwriting in the investment banking sector is reduced.

Proof. Proposition 6 is an immediate corollary of Proposition 5. Commercial banks' monitoring incentives depend positively on the repayment obligation by the entrepreneur. When universal banking is allowed, the equilibrium loan rate is reduced from $\bar{r}_B$ to $\underline{r}_B = \max [\hat{r}_B, \underline{r}_B]$. Therefore, monitoring incentives are reduced with universal banking

($\theta(\underline{r}_B) < \theta(\overline{r}_B)$). We also know that the equilibrium contingent fee in the investment banking sector is increasing in the monitoring level ($\mu'(\theta)>0$) and that $\alpha(\mu)$ is increasing in μ. Thus, the reduced monitoring level by the commercial bank induces a lower contingent fee in underwriting, which in turn results in a lower probability of successful underwriting.

Proposition 5 has empirical implications for corporate governance and the frequency of successful underwriting. Our model predicts that due to reduced incentives to monitor, there will be more instances of corporate malfeasance associated with universal banking. The model also predicts a lower probability of successful underwriting of securities for outside investors in the investment banking sector with universal banking. One concern with the universal banking system expressed in the literature is that the universal bank is less efficient at underwriting than its specialized counterpart (for instance, see Rajan (1995)). According to our model, however, a higher frequency of failed attempts to underwrite should not be attributed to the lack of investment banking specialty in a universal bank. The result is rather due to monitoring spillover between the initial and supplementary projects. Thus, our model provides an alternative explanation for the relative inefficiency of universal banks in the underwriting business.

Kanatas and Qi's (2003) model of universal banking makes a similar prediction concerning the frequency of success in the underwriting business. They consider a situation in which a project of unknown quality can be financed either by direct lending from commercial banks or by investment banks' underwriting of securities to capital

market investors. In their model, the role of an investment bank is to produce information concerning the quality of the potential project to facilitate the security issues of its client firms. They assume that there is a fixed cost to establish a relationship with a client which should be incurred by the intermediary the first time it transacts with its client. This cost is avoided if the client uses the same intermediary for a subsequent transaction. As a result, universal banks' ability to offer "one-stop shopping" for lending and underwriting enables them to "lock in" their clients subsequent business and exercise *ex post* market power. Thus, the underwriting arm of a universal bank faces different incentives from a specialist investment bank; a universal bank can capture an interim rent from subsequent lending business due to the cost advantages conferred by informational scope economies if it fails to sell the client's securities while a specialist investment bank is unable to recoup its underwriting costs if the firm's security issue is unsuccessful. This implies that universal banks will have less incentive to provide the costly efforts that will aid in successful marketing of their clients' securities than specialist investment banks. Even though Kantanas and Qi's and our model make similar predictions, the mechanisms are completely different across models.

We now investigate implications of universal banking for social welfare. We define social welfare as the sum of entrepreneur's and financial firms' surplus.[22] As we have shown, the overall profits of financial firms are reduced as a result of universal banking even if the formation of universal banking is an individually rational strategy. The entrepreneur, however, benefits from the competition between universal banks. Thus, the

welfare consequences of universal banking depend on the relative magnitude of these costs and benefits. To investigate this further, we consider social welfare as a function of commercial banks' direct lending rate, recognizing its impact on the subsequent underwriting of the supplementary project.

$$W(r_B) = \Pi(r_B) + \Gamma(r_B) + \rho[\theta(r_B)] .$$

Let us assume that $W(r_B)$ is concave in r_B. Then the second-best optimal lending rate, r_B^o, is given by the following first order condition:

$$\begin{aligned} W'(r_B) &= \Pi'(r_B) + \Gamma'(r_B) + \rho'[\theta(r_B)]\,\theta'(r_B) \\ &= \theta'(r_B)[\{\gamma(x - r_B) - R_1 + \Psi'[\theta(r_B)]\} + \rho'[\theta(r_B)]] = 0 \end{aligned} \qquad (9)$$

The welfare effects will depend on the relative magnitudes of r_B^o vis-à-vis $\overline{r}_B$ and $\underline{r}_B$.

Proposition 7. If there was under-monitoring from the collective viewpoint of the entrepreneur and commercial bank in a functionally separated banking system (i.e., $\overline{r}_B < r_B^J$), the universal banking system unambiguously reduces social welfare. If there was

[22] With risk-neutrality and a competitive outside capital market, outside investors always get zero expected payoffs.

over-monitoring in a functionally separated banking system, the effect of universal banking on social welfare is ambiguous.

Proof. The effect of an increased commercial loan rate on the investment banking firm is always positive due to the monitoring externality, which can be expressed as $\rho'[\theta(r_B)]\theta'(r_B) > 0$. This implies that the loan rate that maximizes social welfare is always higher than the one that maximizes the joint profits of the entrepreneur and the commercial bank ($r_B^o > r_B^J$).

Case 1. $\bar{r}_B < r_B^J$.

In this case, the equilibrium loan rate is already too low and there is too little monitoring compared to the social optimum. The universal banking system leads to a lower commercial loan rate and further reduces monitoring by the commercial bank, which acerbates the inefficiency.

Case 2. $\bar{r}_B > r_B^J$

In this case, it is still possible that $r_B^o > \bar{r}_B$ if the positive monitoring effect on the investment bank is sufficiently large. In such a case, the universal banking system again leads to a reduction in social welfare. However, if $r_B^o < \bar{r}_B$, the effect of universal banking on social welfare can be positive if $\underline{r}_B > r_B^o$ or $\underline{r}_B < r_B^o$ but r_B^o is sufficiently close to $\underline{r}_B$ as compared to $\bar{r}_B$.

VI. Concluding Remarks

This paper formalizes the idea that financial conglomerates use commercial loans as loss leaders to acquire lucrative investment banking business. To this end, we construct a model of investment banking where supra-normal profits in the investment banking sector cannot be competed away due to incentive problems inherent in the security underwriting business. We show that universal banking serves as a mechanism to capture rents in the investment banking sector by providing cross-subsidization for commercial banking. We argue that universal banking may have unintended effects for corporate governance in that the attractive loan rates offered have an adverse effect on commercial banks' monitoring incentives and thus induce entrepreneurs to pursue private rents to a greater extent.

The model predicts a lower probability of successful underwriting in the investment banking sector with universal banking. However, it should not be attributed to the inherent inefficiency or lack of specialty by universal banks. It is rather due to commercial banks' reduced monitoring incentives by under the universal banking system and their subsequent effects on investment banks' efforts in the underwriting business.

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