CORPORATE BONDS UNDERWRITTEN BY COMMERCIAL AND INVESTMENT BANKS: ANALYZING THE DEFAULT RISK

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ABSTRACT

Starting in the early 1990s, banks began to slowly make their way into securities underwriting using their Section 20 subsidiaries. With the enactment of the Gram-Leach-Bliley Act in 1999, the long-standing restrictions between commercial- and investment-banking activities were formally removed. The rapid ascendancy of many large banks in the securities underwriting league tables has revitalized the debate concerning the gains (private information certification benefits) and costs (conflicts-of-interest costs) of combining commercial and investment banking. This paper examines the merits of these competing views on bank entry by analyzing the post-issue performance of corporate bond issues managed by investment and commercial banks during 1990-2003. The empirical findings reveal that commercial and investment banks underwrote the same quality of high-yield bonds in this period. Investment-grade bonds underwritten by banks, however, experienced higher default rates because of the proliferation of fallen angels in 2000-2003. Bank-advised unrated bonds had a lower default rate, signifying that banks may be better at certifying opaque firms where private information is more critical. The aftermarket performance of bonds was not adversely influenced by pre-existing loan relationships between bank underwriters and issuers.

Keywords: Gram-Leach-Bliley Act, securities underwriting, conflicts of interest, certification hypothesis, proportional hazard model, loan relationships.

JEL Classifications: G3, G24

1. INTRODUCTION

The Gramm-Leach-Bliley Act (GLBA) enacted by the U.S. Congress in November 1999 removed many Federal and State legal barriers prohibiting the affiliation of commercial banks (thereafter referred to as banks) with securities firms, insurance underwriters, and other financial services companies. GLBA permits banks to fully compete with investment banks and large global universal banks by offering the same broad range of products and services. GLBA also gives financial organizations more flexibility in structuring these new affiliations through a financial holding company structure, or a financial subsidiary.

Recent highly publicized corporate scandals and abusive practices involving many prominent financial institutions have renewed the debate about whether it was prudent to repeal Glass-Steagall. Many of these financial problems can be usually traced to the tech IPO euphoria that preceded GLBA. Unavoidably, the spotlight also fell on GLBA because it eliminated many of the barriers put in place to allegedly prevent conflicts-of-interest exploitation between commercial- and investment-banking activities.

What are the benefits and risks of bank entry in underwriting debt and equity securities? Broadly speaking, there are two competing views on how bank entry can affect the competitive structure of the securities underwriting markets. Supporters of GLBA argue that banks as superior information specialist can reduce uncertainty, enhancing the aftermarket performance of securities issues (the so-called *certification hypothesis*). The underlying premise for these certification arguments has been extensively explored in the financial literature. Essentially, the need for certification arises from information asymmetries existing between firm insiders and outsider investors (Myers and Majluf (1984)). Underwriters are information specialists that can bridge this information gap between insiders and investors. Investment banks have historically performed the

role of information intermediary in securities underwriting, managing and selling the offering for issuing firms. Banks bring a new dimension to the certification process because as lenders they have joint-production informational advantages (gathered primarily from screening and monitoring borrowers) that can be shared with investors.

The opposing view is that the commingling of lending and underwriting can exacerbate conflicts of interest. These problems are again intrinsic in financial intermediation, stemming from informational asymmetries and other market imperfections (Saunders (1985), Demski (2003) and Walter (2003)). Critics of GLBA argue that banks can potentially use private information to profit at the expense of their clients by extracting rents and mispriced transfer risk. An often-heard argument is that bank underwriters may use underwriting to lower their own credit risk exposure. This argument was exploited very effectively in 1933 to convince the Congress to enact the Glass-Steagall restrictions as a number of major banks were accused of passing through bad credit risks to unsuspecting bond investors (Puri (1994)). Proponents of GLBA dismiss this viewpoint arguing instead that banks are more inclined to use private firm information to certify public issues and reward investors with better performing securities.

Another more fundamental concern about GLBA is that agency problems arising from the combination of investment and commercial banking activities would increase the riskiness of banks. Arguably, today's financial landscape dominated by giant financial intermediaries and the more concentrated structure of underwriting markets also amplify these risks. Conflicts-of-interest problems can potentially undermine the reputation of the underwriter. Reputational risk is uniquely different from credit risk or other market risks because "reputation capital" cannot be easily

replenished.[1] Like any other business relationship, bank underwriters need to maintain a stellar record to safeguard the franchise value of their business.[2]

Securities underwriting on its own is principally a fee-generating business that does not necessarily involve a substantial commitment of bank resources and capital. On the surface, it does not appear therefore that underwriting should amplify traditional banking risks (e.g. credit or interest rate risk), although occasionally these securities activities do entail some price or market risk.[3] Both issuers and bank underwriters regard these relationships as beneficial. Banks view bond underwriting as way to establish closer relationships with the issuer's management, generating more cross-selling opportunities for their higher-margin products and services. From the issuer's perspective, electing to go with a bank underwriter enhances access to much coveted loans. There is anecdotal evidence suggesting that banks have used loans or the promise of future loans as way to expand into the lucrative securities underwriting and merger advisory business.[4] While these synergies could very profitable for banks, the commingling of underwriting and commercial banking can also expose banks to higher credit risks arising from conflicted lending (Allen and Peristiani (2007)).

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[1]Reputational risk is defined as any risk that arises from a negative public opinion. Reputation risk impacts a firm's capacity to maintain existing client relationships or establish new client relationships. This risk may expose the firm to litigation and increased regulatory scrutiny, which in turn could result in significant financial losses and diminished franchise value.

[2]The adverse effect of reputation risk on franchise value was recently illustrated by the choice of several commercial banks to disassociate or close their once high-flying brokerage units that were tarnished by the Internet melt-down. For example, in 2002 FleetBoston decided to close its Robertson Stephens brokerage subsidiary after failing to find a buyer. Similarly, US Bancorp opted to spiff off Piper Jaffray as an independent company.

[3]Underwriters are often committed to sell the securities at an agreed price and therefore are exposed to demand shocks that may force them to sell the securities at a loss.

[4]Jonathan Sapsford, "Banks Give Wall Street a Run for its Money," *Wall Street Journal*, January 5, 2004, C1.

This paper contributes to the literature by comparing the ex post survival of debt securities underwritten by commercial and investment banks during 1990-2003. Reputational risk is more obscure conceptually and therefore more difficult to measure directly. Consistent with previous studies, we employ an approach that measures exposure to reputational risks based on the long-term performance of corporate securities managed by commercial and investment banks. The primary gauge of long-term performance is the ability of the issuing firm to survive in the aftermarket. We use a proportional hazard framework to analyze the default rate (or distress ratio) of debt security issues.

Hazard regression results show no significant difference in default performance among speculative-grade securities underwritten by commercial and investment banks. In contrast, investment-grade debt issues managed by syndicated that included commercial banks exhibit a higher conditional rate of default. While this observed underperformance is consistent with conflicts-of-interest arguments, the higher default rate for bank underwritten high-grade issues appears to be a consequence of aggressive bank entry and the rapid deterioration in the performance of investment-grade companies in 2000-2003.

Another interesting empirical finding is that banks have underwritten better performing unrated bond issues. The conflicts-of-interest and certification hypotheses are essentially based on the presumption of how private information will be used. The higher survival rate among bank-advised unrated bond issues indicates that bank underwriters have the most to offer in the unrated securities market where information asymmetries are greatest and therefore the demand for their certification services is perhaps more valuable.

The direct comparison of bonds underwritten by commercial and investment banks offers a useful way to uncover some of the potential conflict of interests in bank underwriting. Strictly

speaking, however, many of the criticisms are based on the premise that banks would exploit existing private lending relationships at the expense of clients. In the second phase of analysis, we estimate the impact of pre-existing syndicated loan relationship between underwriters (lenders) and issuers (borrowers) on bond performance. The link between bank lending relationships and aftermarket bond performance is more ambiguous. Nevertheless, at the very least, the results demonstrate that bond issues with pre-existing lending relationships between the issuer and its bank underwriter are not riskier than other similar securities.

These findings are somewhat encouraging for bank entry into securities underwriting. In particular, the finding that lending relationships do not influence the aftermarket performance of bonds dispels any concerns that banks might exploit private information by transferring risks to investors. The higher distress ratio for bank-advised investment-grade bonds, however, demonstrates that banks' aggressive push into the more lucrative segments of bond underwriting has amplified reputational risk exposures. The perils of combining lending with debt underwriting are evident in the substantial public and regulatory scrutiny, not to mentioned significant settlement costs, faced recently by a number of large banks because of their dealings with Enron and WorldCom.[5]

The paper is organized as follows. Section 2 discusses the related literature. Section 3 describes our data sources and provides an overview of the equity and bond securities underwriting markets. In Section 4, we develop the proportional hazard model for analyzing bond distress and Section 5 presents our empirical findings. We conclude in Section 6.

[5]A nice description of these agency problems is presented in "Conflicts, Conflicts, Everywhere; Commercial Banks after Enron," *Economist*, January 26 2002.

2. RELATED LITERATURE

The empirical literature examining the impact of bank entry in securities underwriting has largely focused on documenting the benefits and costs to issuers. Several studies analyze the competing certification and conflict-of-interest hypotheses by comparing the offering price and cost structure of issues underwritten by commercial and investment banks. The key issue is whether net proceeds (underwriting spreads and fees) for issuers that rely on banks are better than those choosing investment banks. Kroszner and Rajan (1994) and Puri (1996) analyze investment-banking activities of banks before the enactment of the Glass-Steagall Act. Both studies conclude that banks underwrote better quality debt securities and enhanced pricing, findings that are favorable to the certification hypothesis.

Several papers also investigate the impact of bank underwriting on issuing costs in the 1990s. Gande (1997) and Gande, Puri, and Saunders (1999) highlight the positive benefits of price discovery and joint production, finding that banks were able to underwrite debt with narrower yield spreads and offer lower underwriting fees for clients with prior lending relationships. Roten and Mullineaux (2002) dispute some of the pro-competitive findings of the previous literature, concluding that that there is no empirical support that lending relationship impact underwriting yields. Fang (2005) also analyzes the relationship between underwriter reputation and the price and quality of bond underwriting services. Controlling for the endogeneity in issuer-underwriter matching, the author concludes that reputable banks obtain lower yields for their issuing clients while at the same time charge higher fees. Overall, issuers are left with higher net proceeds.

Several recent studies also stress in a more general context the benefits of reusability of information and potential economies of scope, arguing that they make it possible for loan arrangers to offer related underwriting services at lower cost. Saunders and Stover (2001) demonstrate the benefits of combining underwriting and commercial banking in the case where a bank serves as

underwriter and as credit guarantor. Ljungqvist, Marston and Wilhelm (2006) find that closer pre-existing banking relationship increase the likelihood of getting underwriting contracts. Finally, Yasuda (2005) shows that banks are more likely to win underwriting business if they have established prior lending relationships. However, she also discovers that, while loan rates on relationship loans are lower than rates on non-relationship loans, relationship bank underwriters tend to charge higher underwriting fees.

A major challenge in analyzing the pricing structure of corporate issues is that many of the factors, such as the quality of service and pricing structure of competing underwriters that determine the demand-supply schedule, are latent. By comparison, empirical studies that investigate relationship between long-term performance and reputational risk in corporate underwriting are not hampered by these endogeneity problems. The premise of these studies is fairly straightforward. Is there any evidence that banks brought into the market riskier securities? Once more, a number of papers investigate the long-term performance of debt underwritten before the enactment of the Glass-Steagall restrictions (see for example, Kroszner and Rajan (1992), and Ang and Richardson (1992), and Puri (1994)). These studies find little evidence that debt issues underwritten by banks were riskier or underperformed over the long run compared to similar debt issued by non-bank institutions.

3. OVERVIEW OF SECURITIES UNDERWRITING MARKETS

We use several data sources to analyze the performance of corporate bond issues. Information on corporate bond issuance was obtained from the *Thomson Financial Securities Data Corporation* (SDC) database. The sample period for this study is conveniently confined between January 1, 1990 and December 31, 2003, corresponding roughly to the time during which banks began to actively compete with investment banks in securities underwriting. The final sample of

bond issues excludes all convertible issues and offerings by financial companies.[6] The SDC database contains an extensive array of issue attributes describing primarily the bond issue as well as the issuing firm. Additional information on bond issuance and firm characteristics is obtained from the *Bloomberg Financial*, Standard and Poor's *Compustat* and the *Center for Research in Securities Prices* (CRSP) database.

The Federal Reserve began to gradually ease restrictions on securities underwriting activities for banks in 1987 based on an exception in the Section 20 of the Glass-Steagall Act. At first, banks were allowed to underwrite certain types of securities but eventually were permitted to expand into debt and equity underwriting. Despite the revenue limits imposed by the Federal Reserve, banks made considerable inroads in securities throughout the 1990s.[7] At the end of 2003, banks accounted for roughly 53 percent of volume of proceeds in equity underwriting and 61 percent of volume bond underwriting (Figure 1).

As shown by the bottom panel of Figure 1, the erosion of Glass-Steagall restrictions was particularly felt in debt underwriting with bank steadily gaining market share throughout the 1990s. The rapid emergence of banks is not surprising because debt underwriting and lending are close complements. The strong gains of banks in debt underwriting in the post-GLBA period was also aided by a number of other factors. The economic downturn of 2000 and the corporate scandals that ensued hampered investment banks' ability to compete with banks in debt underwriting. Investment banks were forced to significantly reduce their bond inventories after a flight-to-quality. Meanwhile most banks were able to escape large trading losses and maintain healthy balance sheets.

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[6]A significant fraction of bonds issued by financial companies (roughly 14 percent of total issuance) are self-managed offerings, meaning that the underwriter was issuing debt for itself or a subsidiary company.

[7]Initially, Federal Reserve rules restricted revenues from securities-related activities to no higher than 5 percent of total bank revenues. This limit was raised subsequently to 10 percent in 1989 and finally to 25 percent in 1996.

Commercial bankers also have inherent advantages over investment banks because they are in the business of making loans that are sorely coveted by a lot of the bond issuers. Although tying lending and bond underwriting is illegal, lending is perfectly lawful when requested by the issuer.[8] Banks may be better positioned to provide cheap loans or offer better terms on underwriting to exploit synergies from corporate relationships. Debt issuance enables banks to establish closer relationships with company chief financial officers and treasurers, creating more cross-selling opportunities for their higher-margin products. Drucker and Puri (2005) investigate the role between existing lending relationships, typically around the time of a seasoned equity offering (SEO), and the likelihood of winning the underwriting business. The authors discover that lending relationships are pervasive not only among commercial banks but also among investment bank underwriters, although investment banks appear to compete more aggressively on SEOs. Moreover, this study shows that the existence of a lending relationship enhances joint-production benefits in the form of lower underwriting fees and loan spreads for issuers. At the same time, targeted loan relationships enhance equity underwriting and generate additional business from the issuers.

Banks got into securities underwriting primarily by acquiring or merging with midsize investment banks or other financial services firms (Chaplinski and Erwin (2001)). The large influx of banks, however, does not appear to have greatly changed the structure of the debt underwriting market. Table 1 summarizes key features of bonds issued by nonfinancial firms before and after the adoption of GLBA. As new entrants seeking to establish their presence in the debt markets, banks at first underwrote debt securities for smaller and often unrated firms. As seen from Table 2, investment banks dominated the investment-grade market before GLBA, underwriting bigger firms

[8]In addition to possible cost of funding advantages, there are also technical accounting reasons why commercial banks are more willing to offer loans. Commercial banks are only required to carry loans at face value. In contrast, investment banks are required to follow mark-to-market accounting for loans.

with higher S&P ratings. Bank underwriters have managed to overturn this size- and credit quality-gap advantage in the post-GLBA period.

4. EVALUATING THE POST-ISSUE PERFORMANCE OF BONDS

We use a duration approach to evaluate the default performance of bonds issued by commercial and investment banks. Duration models (often referred to as survival or hazard models) offer a very efficient framework for estimating the aftermarket performance of bonds because these securities have well defined point of inception. Over its life, a corporate bond can transition into a number of possible but mutually exclusive states. Normally, a bond is expected to mature and repay its principal at the stated date of maturity. Corporate bonds are sometimes callable by the issuer typically with a predetermined time schedule, after which the firm has the option to repay the security if it wishes. Finally, issuers may default on their promise to pay interest and principal on the due dates and in the promised amounts.

Survival analysis offers a very convenient framework for modeling all the termination events treating them as competing risks. The competing risks approach assumes that the occurrence of one type of event effectively eliminates all other outcomes. As expected, default risk has garnered over the years a lot of interest in the academic literature (see for example, Altman (1989) and Asquith, Mullins, and Wolff (1989)). A number of empirical studies have also investigated the decision to call a corporate bond. Vu (1986) argues that there are delays in the optimal decision to call a bond. He shows that a large fraction of the callable bonds were not called even though they traded above their call prices. McDonald and Van de Gucht (1999) investigate individual-level default and call events in the high-yield corporate bond market. They find that the call rate is influenced by the size of the firm and the maturity of the bond.

While the call option is a very important feature in the life of the bond, this paper does not analyze this termination event, concentrating instead on default. Default is a very useful signal in accessing the validity of certification and conflicts-of-interest theories. In contrast, it is unclear how agency problems would affect the optimal timing of bond calls. Thus, although we estimate a full-fledged model of competing risks for all three events, our analysis focuses only on the risk of default.

4.1 *Proportional Hazard Model*

We use a proportional hazard framework to analyze the default rate of corporate debt securities. Let τ_i denote a random variable representing the time to termination of corporate bond (i) and $J = (\text{default} = 1, \text{call} = 2, \text{maturity} = 3)$ a random variable denoting the three types of bond terminations. The hazard for the termination event (j) for bond (i) where $(j = 1, 2, 3)$ is defined as follows:

$$\lambda_{ij}(t) = \lim_{\Delta t \to 0} \frac{P(t \le \tau_i \le t + \Delta t, J_i = j \mid \tau_i \ge t)}{\Delta t}. \qquad (1)$$

The total hazard rate for the i-th bond is simply the sum of the termination hazards, defined as $\lambda_i = \sum_{j=1}^{3} \lambda_{ij}(t)$. The proportional hazard framework asserts that

$$\lambda_{ij}(\tau) = \alpha_j(\tau) \exp(x_{it\bullet} \gamma_j). \qquad (2)$$

The vector $x_{it\bullet}$ represents a set of exogenous variables affecting the termination of bonds. The function $\alpha_j(\tau)$ is commonly referred to as the baseline hazard function. The parameter vector γ_j captures the impact of the explanatory variables for the different bond termination events.

As noted previously, our analysis focuses on estimating the determinants of default termination. In its most general form, the default hazard can be estimated by a regression panel

where the conditional probability of default is traced across time for every bond. However, because due diligence by commercial and investment bank lead underwriters is done before the offering, the specification used in this paper is cross sectional conditioned on information as of the time of issuance.

4.2 *Identifying the Final Status of Bonds*

To estimate the conditional probability of default, the status of the bond is established as of the end of 2003. The SDC corporate bond database provides ex ante descriptive information as of the time of issuance collected mostly from company filings. A corporate bond is therefore identified as callable but no information is available on whether the bond has been subsequently called, defaulted or matured. To ascertain whether the option on a callable bond has been exercised, we use information from Bloomberg Financial that identifies the final status of bonds.

Determining the default status of corporate securities (especially unrated ones) is more involved because a number of criteria can trigger a default. A generally accepted definition of default for rated bonds is the assignment of a D rating by the rating agencies. Default can be also triggered by bankruptcy filings, missed coupon payments, and distressed exchanges. Our analysis relies on several sources to compile a comprehensive sample of distressed bonds.[9] A list of bankruptcies is obtained from the SDC database on corporate restructurings. This information is furthermore enhanced by cross checking it with a similar bankruptcy database provided by *Bankrupcty.Com*. In addition to corporate bankruptcy, we also considered ratings and default information using bond-level information from Standard and Poor's *CreditPro* database and

[9]In reality, many of these distressed corporate bonds may continue to trade in the secondary market long after the time of bankruptcy or default, usually at deep discounts. One of the reasons for the ability of the distressed bonds to garner some interest from investors is that often firms in chapter 11 are able reorganize and come out of bankruptcy, providing bondholders with a partial recovery of some of the face value. The hazard model assumes that an issuing firm that falls into distress ceases to exist.

Bloomberg Financial, respectively. As a final step, the analysis classifies any bond as distressed if any publicly traded issuer was dropped (that is, suffered a negative delisting) by the major stock exchanges.[10]

Table 3 summarizes the status of all bond issued during the period 1990-2003 as of the end of 2003. As expected, most bond issues have either matured or are outstanding during the study period. The aggregate (cumulative) default ratio over this sample period for industrial issuers is 7.37 percent. Most of the distress, however, occurred in speculative-grade bonds that had a default ratio of 22.79 percent. A large fraction of junk debt issuance (71.27 percent) is callable. Smaller speculative-grade companies, especially those that feel that their business will continue to grow, find callability very attractive because it gives them the opportunity to refinance in the future. Focusing on callable speculative issues, we observe that only 39.39 were eligible to be called as of the end of 2003, although roughly one third of the callable junk issues (14.71 percent) were called. This result is consistent with previous studies showing that the call feature in corporate bonds is not always optimally exercised.[11]

4.3 *Determinants of Bond Default*

Empirical studies of financial bankruptcy have demonstrated that the probability of default is related in part to bond offering characteristics. Not surprising, the initial credit agency rating is an important factor in explaining the variation in bond defaults (Altman (1992)). The proportional hazard regression model controls for credit rating quality by including a numerical S&P rating of the bond at the time of issue (RATING). Initial credit ratings, however, cannot fully explain the likelihood of default, an event that can sometimes emerge long after the security is issued. The

[10]Negative equity delistings portend serious problems for a firm. Companies are often dropped because they have insufficient capital or their stock price falls below the required minimum level.
[11]Although 39.39 of the issues were technically eligible to be called, we do not have information to determine the fraction of these securities that were in the money at any time during this period.

regression includes several additional bond-level characteristics that help capture a range of features that may be related to default. In particular, the specification controls for the relative size of the bond issue (SIZE) measured by the proceeds of the bond offering divided by the aggregate proceeds in that year. The relative size adjustment corrects for the propensity of bond proceeds to grow over time.

As seen from Table 3, callable bonds are more likely to be issued by speculative riskier firms. The binary variables CALLABLE and SINKING_FUND indicate whether the bond is callable or has sinking fund provisions. Similar to the call feature, a sinking fund provision requires an issuer to retire or buy back part of the bond issue at par. Sinking fund provisions are expected to enhance liquidity, lowering the likelihood of default; however, as clearly shown in Table 1, this feature is rarely used. The regression specification includes several additional dummy regressors indicating private firms (PRIVATE), subordinate debt (SUBONDINATE), and 144a issues (ISSUE144a).

The price and maturity structure of a corporate bond are also very good predictors of the post-issue performance of bonds. The hazard regression includes the stated maturity of the bond (MATURITY) measured in years, the coupon rate (COUPON), and initial credit spread of the debt issue defined by the difference between yield to maturity and the yield on a comparable maturity Treasury security (BOND_SPREAD). This spread explanatory variable measures the risk premium, reflecting investors' perception of the credit quality of the bond, and is especially useful for unrated securities that lack a direct credit-rating control.

The focal point of our investigation is to test the impact of bank underwriting on the conditional probability of default. The SDC bond database provides in great detail all lead book runner and co-managers of the issue. While co-managers play a key role in marketing and selling

the debt issue, due diligence and other major decisions in launching and pricing the deal are done primarily by the lead book runners, often referred to as lead managers or managing underwriters.

The regression specification controls for the number of lead managers participating in the issue (NUMBER_MANAGERS). More important, the model includes an explanatory variable indicating the issues advised by banks (BANK_UNDERWRITER). A negative coefficient on BANK_UNDERWRITER would imply that bank-managed debt securities have a lower default rate, a result that is inconsistent with conflict-of-interest theories. The hazard specification uses a broad measure of BANK_UNDERWRITER that accounts for the joint presence of commercial and investment bank as lead underwriters. In roughly 94.5 percent of the issues the underwriting syndicate is managed by a single lead book runner, meaning that in these cases BANK_UNDERWRITER is either a zero or one. In another 4.3 percent of the offerings, however, the bond offering is managed by two lead managers, and finally about 1 percent of the bond issues involved three joint lead managers. To account for the multiparty presence of commercial and investment bank underwriters, the binary BANK_UNDERWRITER is modified into an index measuring the fraction of the issue managed by banks.[12]

Admittedly, the use of a binary indicator BANK_UNDERWRITER is a weak form of testing the more complex conflicts-of-interests or certification hypotheses. The certification hypothesis asserts that banks will use their private information to benefit issuers and investors. The dummy variable BANK_UNDEWRITER simply indicates that the bond syndicate includes a bank. This bank indicator is a noisy proxy for measuring the potential benefits of bank certification because the lead bank underwriter may not necessarily have longstanding relationships with the bond issuer to deliver any certification benefits to investors. In the next section, we will also

[12]For instance, when one of the two lead managers is a commercial bank then the variable BANK_UNDERWRITER equals 0.5.

consider alternative regressors that better capture the lending relationship between the issuer and underwriter.

Finally, although these regression estimates are not reported for brevity, the specification includes year dummy variables that capture the impact of aggregate macro conditions or time-related variation between 1990 and 2003.

5. RESULTS

Table 4 presents the partial maximum likelihood estimate of the proportional hazard model for defaulted bonds. The hazard regression is estimated for nonfinancial (industrial) firms. We also estimated the proportional hazard model over the entire sample of issuers (excluding self-managed financial deals in which the issuer and lead underwriter represent the same financial firm). Overall, the parameter estimates were found fairly similar for both samples, suggesting that similar forces are driving default among both the financial and industrial sectors. The large and significant likelihood ratio χ^2 statistics, reported at the bottom of each table, signify that the proportional hazard model fits the data very well.

As expected, the variable RATING, which represents the S&P credit rating of the issue, strongly influences the conditional probability of default. While the initial credit rating is a very important gauge of default, several other bond attributes also help predict post-issue performance. The presence of a call feature in a corporate bond is also a good predictor of distress. Callable bonds exhibit, on average, a significantly higher probability of default. For example, the hazard ratio for high-yield and investment-grade callable bonds is about 1.4. In comparison, the hazard ratio for unrated callable debt is over 2.8.[13] As noted previously, the callability feature is fairly common among speculative-issue bonds. Low-grade issuers saddled with higher coupon payments are often

[13]The hazard ratio for callable bonds is defined as $\frac{\text{P(bond defaults / CALLABLE = 1)}}{\text{P(bond defaults / CALLABLE = 0)}}$

more keen to issue callable debt because the option allows them to refinance the bond at more favorable terms. Even within the same grade of bonds, callability is often a sign of a lower credit quality, which in turn explains the positive relationship between CALLABLE and the probability of default. The relative size of the issue (SIZE) is found to be positively correlated with the likelihood of default for investment-grade and unrated bonds.

Panel B of Table 4 reports a variation of the hazard regression that also controls for the initial risk premium and maturity of the bond.[14] Longer term maturity bonds can expose investors to unanticipated shocks and are therefore expected pay higher coupon rates. Yet, the regression estimates reveal that longer-term high-yield and unrated bonds have a lower likelihood of default. One possible explanation for this result is that more established safer firms are more likely to issue longer maturity debt. Not surprising, we find that risk premiums at the time of issue, measured by BOND_SPREAD, are strong predictors of subsequent default.

An interesting result of the hazard regressions is the positive and statistically significant coefficient estimate on BANK_UNDERWRITER for investment-grade bonds. This result reveals a greater default for bank underwritten issues in the largest and most liquid market. In contrast, the presence of a bank underwriter in the lead manager syndicate reduces the default hazard for unrated bonds and is insignificant for speculative grade bonds. These findings are also illustrated graphically by Figure 2 that plots the distress function for the three different grades categories. The distress function represents the probability that the life of the bond is less than some realized value.[15] As shown by the top panel of Figure 2, the distress function for high-yield bonds is

[14]This information is only available for a subset of the observations in the sample.

[15] Consider again a random variable τ representing the duration of a corporate bond with realizations t. The distress function is defined as $F(t) = \int_0^t f(s)ds = P(\tau \le t)$. Duration analysis focuses primarily on the survival function defined by $S(t) = 1 - F(t)$.

considerable with over 30 percent of speculative-grade bonds failing after 8 years. Although the distress function for high-grade bonds is substantially smaller, bonds underwritten by banks exhibit a greater a propensity of failure over their life.

Distress among investment-grade bonds is usually a rare phenomenon. Altman and Bana (2004) document, however, that distress among high-grade bonds soared after the 2000 market collapse. The authors note that over the two-year period 2001-2002 a total of $220 billion of investment-grade bonds were downgraded to junk. These downgraded firms are often referred to as fallen angels. The positive relationship between BANK_UNDEWRITER and the conditional rate of default for investment-grade issues signifies that banks underwrote a relatively higher proportion of fallen angels. As clearly shown in Table 2, commercial banks made a concerted effort in capturing a greater portion of the investment-grade issuance, boosting their market share from 22 percent in 1990-1999 to 61 percent in 2000-2003.

The apparent long-term underperformance of bank underwritten investment-quality debt appears to be consistent with the conflicts-of-interest hypothesis. But are banks knowingly transferring these risky assets to investors? The recent experience of the highly publicized downfalls of Enron and WorldCom has revealed that top-tier bank underwriters, like JP Morgan and Citigroup, not only had a large loan exposure to these failed giants but also held a lot of their distressed debt.[16] It is more likely that the higher default rate for bank underwritten bonds highlights the pitfalls of certain investment-banking activities for banks. Securities underwriting not only presents banks with greater opportunities but also exposes them to greater risks. These risks were probably magnified by the eagerness of new entrant banks to gain market share in the lucrative high-volume investment-grade market by offering attractive financing to issuers. Dahiya, Saunders,

[16]Jathon Sapsford and Kara Scannell "Banks, Too, Have Stake in Enron Merger – Stature, Money Are Both on the Line," *Wall Street Journal*, November 28, 2001, page C1.

and Srinivasan (2003) argue that market participants are especially alarmed by the combination of debt and lending. They demonstrate that stock returns of banks are adversely affected by high exposures to distressed borrowers.

Another result worthy of note is that unrated bonds managed by banks are found to have a lower distress function than those advised by investment banks. In contrast to our previous findings on high-grade bonds, this outcome appears to support the certification hypothesis. A fairly intuitive interpretation of this finding is that banks as underwriters have the most to offer in unrated bond deals where there is limited information on issuers and therefore the demand for certification services is high. In the absence of formal credit rating reports, banks can utilize their proprietary information on unrated companies to improve the distribution and pricing of the offer and advise more effectively their prospective investing clients. In her study investigating the determinants of the bond prices during the pre-Glass-Steagall period, Puri (1996) discovers that banks played a critical certification role for junior and more information-sensitive securities. The significant gap in distressed ratios between unrated debt securities underwritten by banks and investment houses also underscores the value of relationship banking for smaller more opaque companies. By underwriting these more speculative companies, banks are not only facilitating access to the public markets for these small firms but also help convey useful information to investment-banking clients regarding the long-term performance of these unrated debt securities.

5.1 *Do Bank Relationships Matter?*

The empirical findings presented above reveal a statistically significant link between bond default rate and bank underwriting. The basic idea behind these statistical tests is that bank underwriters are the producers of private information while investment banks do not generally built long-standing relationship through lending activities. The binary explanatory

BANK_UNDERWRITER is intended to convey whether banks as information specialists enhance certification in the sense that they bring to the market more sound securities. One shortcoming of this testing approach is that bank underwriters may not necessarily have the same capacity to certify issuers. In this section, we examine a more discriminating test of the certification hypothesis that attempts to differentiate the extent of the lending relationship across bank underwriters.

We use the *Loan Pricing Corporation* Dealscan (LPC) database to construct a more accurate gauge of the presence of lending relationships between issuers and underwriters. The LPC database documents extensively all syndicated loans granted to large and midsize corporations. Moreover, LPC contains a broad array of loan-specific details including the identity of the borrower, size of loan facility, start and expiration dates of the loan facilities, and more important for our analysis, the names and various roles for the underwriting syndicate. To create an indicator of a lending relationship, we first matched the name of debt issuer to the name of the LPC borrower. Based on this initial match, we are able to establish whether the issuer had also borrowed in the syndicated loan market prior to the bond offering. In the second stage, the names of bond underwriters are matched to senior or lead managers of the loan syndicate.[17] This comparison establishes the actual presence of lending relationship between the issuer and the bond underwriter, albeit it is only confined to syndicated loans.

Table 5 shows that about 21 percent of the debt issuers have also tapped the syndicated loan market over a four-year period prior to their bond offering. Most of the lending activity concentrated among the higher grade issuers. More important for our analysis, the table also reveals the presence of a lending relationship in roughly half of those cases (precisely 9.06 percent), in the

[17]Specifically, the senior lead managers included roles in the LPC database such as "arranger," "administrative agent," "agent," or "lead bank", but excluded "participant" as a lender role definition. Because the LPC database effectively starts in 1986, we can use a fairly long period to establish the presence of a relationship.

sense that one of the syndicated loan arrangers also participated as a lead underwriter in the bond issue.

It is evident from this tabular analysis that syndicated loan relationships between issuers and lead bond underwriting firms are not very pervasive. Nevertheless, these interactions between bond issuers and their bank underwriters are more widespread than investment-banking relationships. The remaining panels of Table 5 illustrate that only a small fraction of the bond issuing companies had an equity underwriting relationship (IPOs or seasoned offerings) with their bond underwriter. The information-gathering potential from merger advisory services is somewhat higher but is concentrated primarily among investment bank underwriters. The scant presence of traditional investment-banking relationships implies that the syndicated loan market is the most significant source of private information.[18]

The results reported in Table 6 analyze the impact of prior lending, and more importantly for the certification hypothesis test, the importance of issuer-underwriter lending relationships. The dummy variable SYNDICATED_LOAN indicates that the bond issuing firm has also relied on the syndicated loan market over the four years prior the debt offering. In comparison, the explanatory variable LOAN_RELATIONSHIP indicates that bond underwriter has also served as a loan arranger to the issuing firm over a four-year period prior to the bond offering.[19] It is important to note that lending relationships can occur with both commercial banks and investment banks.

[18]Commercial and investment banks can also accumulate private information from various other relationships including small business lending, merchant banking, trust business, derivatives trading, and an array of advisory roles. Unfortunately, it is very difficult to trace relationships between borrowers and lenders from these potential sources of private information. Most academic studies therefore rely on syndicated loan relationship to establish these links.

[19]In particular, the explanatory variable LOAN_RELATIONSHIP indicates that the underwriter of the bond issue had also arranged one or more loans for the issuer over a period of four years before the bond offering. In the case of a merger between two underwriters, we assumed that the

The hazard regressions were estimated again for the categories of high-yield, investment-grade and unrated bonds. Looking at the first two columns of Table 6, the positive and statistically significant coefficient on SYNDICATED_LOAN signifies that bond issuers that rely also on the syndicated loan market exhibit a higher default hazard in both speculative- and high-grade bond markets. While bank credit is a vital source funding for firms, as adverse selection theories advocate, syndicated lending might also be a sign of excess risk-taking. For speculative-grade issues, the positive coefficient on the syndicated loan dummy variable is offset by the negative and significant coefficient of the loan relationship indicator. These offsetting coefficients suggest that private information is possibly more useful and meaningful in scrutinizing more opaque speculative-grade companies.

To more precisely measure the impact of bank certification, the regression specification includes the interaction of the BANK_UNDEWRITER dummy variable with the LOAN_RELATIONSHIP indicator. The coefficients on this interaction variable are very insignificant for speculative-grade issues. This result is not surprising, because as shown previously most of the bank-lending relationships are concentrated among the larger issuers of investment-grade bonds. Although statistically insignificant, the impact of bank relationships in high-yield bonds is negative, meaning the bank private information tends to generally lower default.

In contrast to speculative-grade bonds, the presence of prior syndicated loans or the existence of a lending relationship with a bond underwriter is found to increase the conditional likelihood of default for investment-grade debt. Deals underwritten by banks continue to exhibit a greater probability of distress. The strong positive correlation between default and bank underwriting and default and lending relationships may again stem in part from the proliferation of

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information (held by the commercial bank target) is transferred to the acquiring commercial bank for a period of five years.

fallen angels during the latter period of our study. Historically, the default rate among the better quality investment-grade issues is significantly lower than that experienced by speculative-grade firms. While small in numbers, fallen angel firms, such as WordCom and Enron, were very active in the corporate bond market and maintained a very strong presence in the syndicated loan market. Altman and Bana (2004) attribute roughly 40 percent of the defaulted dollars in 2002 to fallen angel firms.

What is notable about the recent large number of fallen angels is how quickly these companies went into default, surprising along the way rating agencies and most stock analysts. To better understand the effect of the fallen angels, the third column in Table 6 re-estimates the hazard regression by eliminating WorldCom and Enron from the sample. Admittedly, this exercise does not remove all the fallen angel issuance from the regression sample. It makes possible, however, to re-estimate the impact of lending and banking relationships by eliminating the bias from two of the most notorious company failures in the 1990s that also maintained a very strong relationship with their underwriters.[20] Looking at this modified regression sample that excludes Enron and WorldCom, we find that the coefficient on LOAN_RELATIONSHIP remains positive and significant but this effect is now entirely nullified by bonds underwritten by firms with existing commercial bank relationships.

The beneficial impact of bank underwriting and direct bank lending relationships is also evident in unrated bond regression, albeit the coefficient the interaction term LOAN_RELATIONSHIP$\times$ BANK_UNDERWRITER is now insignificant. Nevertheless, the

[20]The extent of the conflicts-of-interest problems between Enron and its largest underwriters (JP Morgan, Citigroup, and Lehman) is discussed more extensively in Jonathan Sapsford and Kara Scannell "Banks, Too, Have Stake in Enron Merger: Stature, Money Are Both on the Line," *Wall Street Journal*, November 28, 2001, Section C1; and Randall Smith "Enron's Collapse Roils Insiders and Wall Street: Lehman Faced Possible Conflict as Merger Failed," *Wall Street Journal*, December 5, 2001, C1.

regression results for the sample of unrated banks suggest that bonds underwritten by commercial have a better default experience.

5. CONCLUSION

This paper examines the effect of the landmark GLBA in the financial services industry. Proponents of expanding commercial banks' powers have long argued that bank entry in investment-banking would enhance information efficiencies, improving price discovery and performance. A competing view is that the expansion of bank powers would be disadvantageous to market participants leading to conflicts of interest (both between the bank and its customers and between different clienteles of the bank) and increasing banks' opportunities to do unlawful synergies.

To analyze the benefits or costs of bank entry in securities underwriting, the paper investigates the aftermarket performance of bonds during 1990-2003. Overall, we find no significant differences in performance in the high-yield corporate debt market. Bank-managed investment-grade bonds exhibit higher default rates, a result that signifies the perils of underwriting for new entrants during the stressful post-Internet collapse period of 2000-2002. However, banks underwrote better-performing unrated bonds, a finding that is consistent with certification theories. Banks therefore appear to make the most of their certification ability in the unrated securities market where information asymmetries are larger.

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Table 1. Characteristics of Corporate Bonds Underwritten by Commercial and Investment Banks (Nonfinancial Firms)

	Before GLBA (1990-1999)		After GLBA (2000-2003)	
	Commercial Banks	Investment Banks	Commercial Banks	Investment Banks
Proceeds ($ millions)	92.78	140.23	283.03	295.52
S&P Rating	16.77 (BBB)	17.69 (BBB+)	17.77 (BBB+)	17.32 (BBB)
Callable Bonds (%)	16.06	24.39	48.84	55.37
Sink Provision (%)	0.20	1.202	0.000	0.038
Issue144a Bonds (%)	17.01	18.55	31.87	33.21
Private Companies (%)	68.34	38.61	37.97	44.58
Subordinated Bonds (%)	10.68	9.2	6.75	8.87
Coupon Rate (%)	9.43	8.02	8.81	6.91
Bond Maturity (in years)	7.95	11.24	6.83	7.27
Yield-to-Maturity (%)	8.06	8.26	7.26	9.25
Bond Spread (%)	2.15	2.01	2.64	2.72
Number of Lead Managers	1.03	1.02	1.25	1.42
Sample size	5,260	10,917	2,613	1,509

NOTES: The average coupon rate and initial yield to maturity are based on a smaller number of observations. The S&P rating corresponds to numeric interpretation of the letter ratings (AAA=25, AA+=24,…,D=4). Bond spread is measured by the yield to maturity minus a comparable maturing bond equivalent yield. The rating in parenthesis is the closest corresponding letter rating to the mean numeric value.

Table 2. Credit Quality of Corporate Bonds Underwritten by Commercial and Investment Banks (Nonfinancial Firms)

		Before GLBA (1990-1999)		After GLBA (2000-2003)	
		Commercial Banks	Investment Banks	Commercial Banks	Investment Banks
Grade of Bond					
High-Yield	Number	774	1,961	622	333
	Share (%)	4.78	12.12	7.33	8.08
	Size of Issue	170.69	197.66	284.21	280.53
	S&P Rating	11.48	11.87	12.10	12.01
Investment-Grade	Number	1,680	6,013	1,689	1,073
	Share (%)	10.39	37.17	40.98	26.03
	Size of Issue	130.35	159.19	341.45	301.57
	S&P Rating	19.14	19.56	19.23	19.54
Unrated	Number	2,806	2,943	302	103
	Share (%)	17.35	18.19	7.33	2.50
	Size of Issue	48.79	63.20	61.92	97.92
	S&P Rating	NA	NA	NA	NA

Table 3. Status of Corporate Bonds Issued Between 1990 and 2003 (Nonfinancial Firms as of December 31, 2003)

This table summarizes the status of corporate debt issues during 1990-2003. Values in the table represent the overall percent of bonds for each possible outcome.

	High-Yield	Investment-Grade	Unrated	All Bonds
Matured	10.11	36.52	54.03	37.03
Outstanding (Censored)	52.39	54.92	38.62	49.51
Defaulted	22.79	2.14	7.02	7.37
Called	14.71	6.42	0.33	6.09
Callable Bonds	71.27	27.60	2.85	28.04
• Eligible to be Called	39.39	25.16	1.71	20.24
Total Number of Bonds	3,690	10,455	6,154	20,299

NOTES: The sum of possible status outcomes (matured, outstanding, defaulted, and called) is 100 percent. A bond is defined eligible to be called if it is scheduled to be called before December 31, 2003 (assuming the bond has not defaulted before the scheduled call date).

Table 4. Proportional Hazard for Distressed Corporate Bonds (Nonfinancial Issuing Firms), 1990-2003

The dependent variable is the probability that the bond has gone in distress after τ years, given that it not done so until that point of time. The explanatory vector includes: SIZE = bond proceeds in year (t) divided by total proceeds in year (t). RATING = numerical S&P rating (AAA=25, AA+=24,…,C=5, D=4). SINKING_FUND = 1 if bond has sinking fund provisions, 0 otherwise. ISSUE144A = 144A dummy indicator. SUBORDINATED = 1 if bond was subordinated, 0 otherwise. CALLABLE = binary indicator for callable bonds. NUMBER_MANAGERS = number of lead underwriters advising the issue. BOND_SPREAD = yield to maturity minus a comparable maturing bond equivalent yield (percent). MATURITY = initial bond maturity (in years). COUPON = bond coupon rate (in percent). The symbols (*), (**), and (***) indicate statistical significance that 10-, 5-, and 1-percent level.

Explanatory Variables	High-Yield	Investment-Grade	Unrated	High-Yield	Investment-Grade	Unrated
SIZE	0.044	0.328***	0.316**	0.131	0.666***	0.988***
	(0.15)	(15.65)	(5.90)	(1.21)	(31.44)	(10.15)
RATING	-0.121***	-0.153***		-0.100***	-0.173***	
	(80.41)	(85.33)		(32.51)	(64.17)	
CALLABLE	0.471***	0.525***	1.679***	0.371***	0.403**	0.876
	(25.16)	(11.46)	(78.67)	(13.57)	(5.23)	(13.97)
SINKING_FUND	-0.092	-0.413	-0.385	-0.259	-0.430	0.445
	(0.09)	(0.32)	(0.13)	(0.73)	(0.35)	(0.17)
ISSUE144A	0.599	1.177**	0.588***	1.427	2.324**	0.518**
	(1.72)	(5.87)	(20.91)	(2.01)	(5.13)	(7.10)
PRIVATE	-0.504	-0.481	0.071	-1.458	-1.963*	-1.176***
	(1.17)	(1.02)	(0.065)	(2.08)	(3.68)	(9.40)
SUBORDINATED	-0.488***	-0.135	0.682***	-0.447***	0.210	-0.039
	(40.95)	(0.034)	(28.03)	(30.24)	(0.08)	(0.04)
BOND_SPREAD				0.077***	0.515***	0.162***
				(12.39)	(22.32)	(21.21)
MATURITY				-0.037**	-0.015	-0.081***
				(5.57)	(3.12)	(14.43)
COUPON				0.045	0.015	0.049
				(2.56)	(0.03)	(1.10)

Table 4 Continued next page

Table 4 continued.

Explanatory Variables	High-Yield	Investment-Grade	Unrated	High-Yield	Investment-Grade	Unrated
NUMBER_MANAGERS	0.112	-0.445*	0.11529	0.146	-0.555**	-0.188
	(1.09)	(3.47)	0.0698	(1.75)	(5.27)	(0.13)
BANK_UNDERWRITER	0.036	0.636***	-0.281***	0.056	0.549***	-0.400**
	(0.20)	(15.70)	(7.11)	(0.48)	(10.18)	(6.06)
Number of Bonds	3,674	10,455	6,153	3,436	9,134	2,175
Distressed Bonds	845	224	432	785	206	222
Likelihood Ratio Test	373.09***	235.81***	372.43***	392.59***	291.05***	371.75***

Table 5. Prior Relationships in Bond Underwriting (Nonfinancial Firms), 1990-2003

This table describes the frequency of pre-existing relationships between underwriters and bond issuers. The *syndicated loan indicator* signifies that the issuing company had taken out a loan over a four-year period prior to the bond issue. A *lending underwriting relationship* indicates that the bond underwriter took part in a syndicated loan facility lent out to the bond issuer (as a lead arranger) over a four-year period prior to the bond issue. An IPO (or *secondary*) *relationship* indicates that the bond underwriter also served as a lead underwriter in the equity offering of the bond issuer over a five-year period prior the bond issue. A *merger advisory relationship* indicates that the bond underwriter served as an advisor in a deal where the bond issuer was the acquiring firm. Values in parentheses are the number of relationships divided by the total number of bond issues (percent).

	Investment-Bank Underwritten	Commercial-Bank Underwritten	All Underwriters
Syndicated Loan Indicator			
High-Yield Bonds	516 (2.54%)	406 (2.00%)	
Investment-Grade Bonds	1,226 (6.04%)	1,276 (6.29%)	
Unrated Bonds	336 (1.66%)	493 (2.43%)	
Total	2,078 (10.24%)	2,175 (10.72%)	4,253 (20.96%)
Loan Underwriting Relationships			
High-Yield Bonds	237 (1.17%)	316 (1.56%)	
Investment-Grade Bonds	132 (0.65%)	709 (3.49%)	
Unrated Bonds	90 (0.44%)	356 (1.75%)	
Total	459 (2.26%)	1,381 (6.80%)	1,840 (9.06%)
IPO Relationships			
High-Yield Bonds	170 (0.84%)	31 (0.14%)	
Investment-Grade Bonds	52 (0.26%)	8 (0.04%)	
Unrated Bonds	42 (0.21%)	5 (0.02%)	
Total	264 (1.31%)	44 (0.20%)	308 (1.51%)
Secondary Offering Relationships			
High-Yield Bonds	166 (0.77%)	36 (0.18%)	
Investment-Grade Bonds	82 (0.41%)	14 (0.07%)	
Unrated Bonds	40 (0.20%)	4 (0.02%)	
Total	288 (1.38%)	54 (0.27%)	342 (1.65%)
Merger Advisory Relationships			
High-Yield Bonds	172(0.85%)	90(0.44%)	
Investment-Grade Bonds	429(2.11%)	160(0.79%)	
Unrated Bonds	93(0.46%)	28(0.14%)	
Total	694(3.42%)	278(1.37%)	972 (4.79%)
Total Number of Bonds			20,299

Table 6. Lending Relationships and Bond Performance (Nonfinancial Firms)

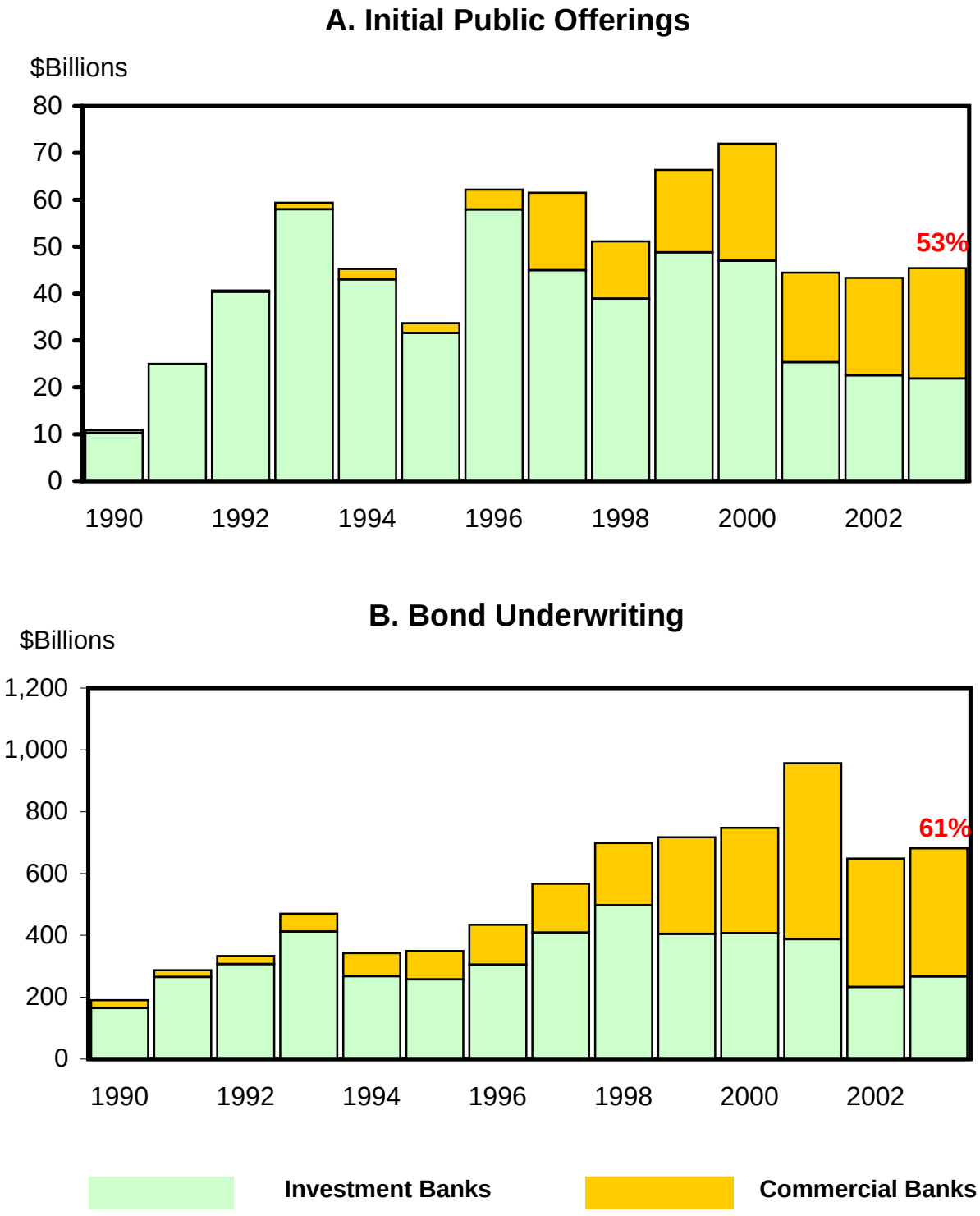
This table presents estimates for a competing risks proportional hazard model for distressed corporate bonds for nonfinancial firms. The dependent variable is the probability that the bond has gone in distress after τ years, given that it has not done so until that point of time. In addition to the variables defined in Table 4, the explanatory vector includes: SYNDICATED_LOAN = issuer has borrowed in the syndicated loan market over the four-year period prior to the bond issue. LOAN_RELATIONSHIP = indicates issues where the lead underwriter in the bond issue has also served as a lead arranger in a syndicated loan over the four-year period prior to the bond issue. The symbols (*), (**), and (***) indicate statistical significance that 10-, 5-, and 1-percent level.

Explanatory Variables	High-Yield	Investment-Grade		Unrated
		All Bond Deals	Without Enron/WordCom	
Bond Characteristics				
SIZE	0.116	0.656***	0.312*	0.847***
	(0.82)	(29.8)	(3.0)	(6.7)
RATING	-0.101***	-0.161***	-0.161***	
	(33.8)	(51.9)	(41.1)	
CALLABLE	0.366***	0.365**	0.071**	0.848***
	(13.1)	(4.2)	(0.1)	(12.7)
SINKING_FUND	-0.218	-0.347	-0.098	0.308
	(0.51)	(0.3)	(0.02)	(0.1)
ISSUE144A	1.406	2.138**	1.189*	0.474**
	(1.9)	(4.3)	(3.4)	(5.9)
PRIVATE	-1.42	-1.754*	-1.704*	-1.310***
	(2.0)	(2.9)	(2.8)	(11.2)
SUBORDINATED	-0.456***			-0.011
	(31.5)			(0.005)
BOND_SPREAD	0.079***	0.542***	0.501***	0.173***
	(12.8)	(22.9)	(12.3)	(24.6)
MATURITY	-0.036**	-0.016*	-0.011*	-0.078***
	(5.1)	(3.1)	(1.2)	(13.3)
COUPON	0.049*	-0.008	-0.132	0.039
	(3.1)	(0.01)	(1.1)	(0.7)

Table 6 continued.

Explanatory Variables	High-Yield	Investment-Grade		Unrated
		All Bond Deals	Without Enron/WordCom	
Underwriting Relationships				
NUMBER_MANAGERS	0.148	-0.624**	-0.304	-0.074
	(1.8)	(6.3)	(1.3)	(0.03)
BANK_UNDERWRITER	0.099	0.477**	0.323	-0.546***
	(1.1)	(7.1)	(1.6)	(8.1)
SYNDICATED_LOAN	0.487***	0.636***	0.049	-0.141
	(15.7)	(8.3)	(0.3)	(0.2)
LOAN_RELATIONSHIP	-0.490**	0.732*	1.401***	1.216***
	(7.2)	(3.4)	(9.4)	(10.7)
LOAN_RELATIONSHIP × BANK_UNDERWRITER	0.464	-0.407	-1.600***	-0.864
	(2.1)	(0.6)	(6.7)	(1.7)
SYNDICATED_LOAN × BANK_UNDERWRITER	-0.402	-0.365	0.635	0.834
	(2.3)	(0.8)	(1.9)	(1.8)
Number of Bonds	3,436	9,134	9,134	2,175
Distressed Bonds	785	206	206	222
Likelihood Ratio Test	407.4***	313.0***	240.5***	400.5***

Figure 1. Increasing Role of Banks in Securities Underwriting (Volume of Domestic issues)



*Market share of banks in 2003

Figure 2: Distress Ratios for Corporate Bonds, 1990-2003