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Commercial banks in investment banking Conflict of interest or certification role?

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Abstract

When commercial banks make loans to firms and also underwrite securities, does this hamper or enhance their role as certifiers of firm value? This paper examines empirically the pricing of bank-underwritten securities as compared to investment-house-underwritten securities over a unique period in the U.S. (pre-Glass-Steagall) when both banks and investment houses were allowed to underwrite securities. The evidence shows that investors were willing to pay higher prices for securities underwritten by banks rather than investment houses. The results support a certification role for banks, which is more valuable for junior and information sensitive securities.

Key words: Glass-Steagall; Banks; Certification; Conflict of interest; Security pricing
JEL classification: G21; G24; N22

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1. Introduction

There has been considerable controversy in the U.S. concerning the participation of commercial banks in corporate securities underwritings. Arising from concerns that combining underwriting with lending presented a potential 'conflict of interest' that was detrimental to investors, the Glass-Steagall Act of 1933 effectively prohibited commercial banks from underwriting corporate securities. Recently, the debate on allowing commercial banks to underwrite corporate securities has resurfaced, both in Congress and among regulators.[1] The interesting question is: Does the empirical evidence regarding conflicts of interest support the concerns of those opposed to Glass-Steagall deregulation? This paper investigates this question by analyzing *ex ante* pricing of securities underwritten by commercial banks and investment banks in a pre-Glass-Steagall period.

To understand how conflicts of interest are reflected in a security's price, it is important to examine the underwriters' incentives in certifying a security's value. The key difference between commercial banks' and investment banks' (hereafter, 'house') incentives arise from the loan-making activities of commercial banks. In making and monitoring loans, commercial banks obtain information about a firm not generally known to external investors[2] (for example, through scrutiny of internal budget statements and factory/inventory inspections). Unlike banks, investment houses do not, in general, acquire private information from lending activities. As a result, high information collection costs can induce investment houses to produce less information than banks, despite potential reputation losses from 'uninformed' certification (see Puri, 1994b, for a theoretical derivation

[1]The Glass-Steagall Act of 1933 prohibited national banks from engaging in securities activities, either directly or through affiliates. The Act was passed amidst allegations of abuses by commercial banks, recorded in the Pecora Committee hearings which conducted an investigation of misdoings of banks (see U.S. Senate hearings on Stock Exchange Practices, 1934). In 1987, the provisions of Glass-Steagall were relaxed with some banks (for example, J.P. Morgan and Bankers Trust Co.) being allowed to set up Section 20 subsidiaries that could underwrite securities. These are subject to 'firewalls', that is, no communication with the parent bank is allowed. Recently the Office of the Comptroller of Currency (OCC) proposed that direct bank subsidiaries be allowed to underwrite securities (*New York Times*, November 29, 1994). Further, the Clinton administration, as outlined in a speech by Treasury Secretary Robert Rubin, proposed the elimination of Glass-Steagall (*Wall Street Journal*, February 27, 1995)

[2]As informed lenders, banks can convey information about the firm to outside creditors in the absence of an underwriting function, through say, renewal of loans, see for example, Fama (1985). Empirical evidence of a certification role of banks is provided in James (1987), in Lummer and McConnell (1989) where renewal of loans acts as a positive indicator of firm value, and in James and Weir (1990) where the existence of a banking relationship results in less IPO underpricing. Booth and Smith (1986) also refer to a certification role for intermediaries.

of these effects). Banks are therefore better informed than investment houses, and their underwritings can have a stronger 'certification effect' than those of investment houses.

This potentially stronger certification effect has to be weighed against a 'conflict of interest effect', arising from banks' incentives to misuse private information gained through their lending activities. For example, by underwriting securities they privately know to be questionable and by requiring that the proceeds from the issue be used to pay down loans, banks can protect their own interests at the expense of outside investors in the newly issued securities (for a detailed discussion of various kinds of conflicts of interest faced by banks see Benston, 1990; Saunders, 1985). As a result, banks have to weigh the gain from such activities against a loss of reputation from not certifying such issues correctly. Since investment houses do not engage in loan-making, and therefore do not have the same conflict of interest, they will be more credible certifiers of firm value (if both underwriters have equal information).

Rational investors should anticipate which intermediary type has a higher net certification effect (that is, the certification effect net of any conflict of interest) and price securities accordingly. In particular, if investors perceive that conflicts of interest are strong, it is likely that bank-underwritten issues will be priced lower (have higher yields) than similar investment-house underwritings. On the other hand, if conflicts of interest appear to be small, bank issues will be priced higher.

This paper adds to research relating to the controversy regarding banks engaging in corporate securities underwriting activities.[3] It is one of the first papers to evaluate conflicts of interest by examining *ex ante* pricing. There is a recent group of studies focusing on the pre-Glass-Steagall period (see Ang and Richardson, 1994; Kroszner and Rajan, 1994; Puri, 1994a) that assess conflicts of interest by examining *ex post* default performance. However, examining only *ex post* default performance is inadequate for reaching conclusions regarding the exploitation of potential conflicts of interest. Examining a security's pricing is equally important, since this pricing reflects expected default rates on the security. For example, even if bank-underwritten securities defaulted more often, but investors paid substantially less for these issues, it would be unclear whether conflicts of interest had been exploited. In examining pricing this paper's main finding is that bank-underwritten issues generated higher prices than similar investment-house underwritings suggesting that conflicts of interest were minimal. Thus, investors perceived such issues to be a higher quality, *ex ante*. This

[3]Banks' involvement in activities broader than merely taking deposits and granting loans has been modeled by Berlin, John, and Saunders (1994), Kanatas and Qi (1994), Puri (1994b, 1995), and Rajan (1994). Some related early empirical studies are Edward (1942) and Moore (1934). For empirical work in Germany, in a somewhat different context, see Calomiris (1993).

result of higher *ex ante* quality by investors for bank-underwritten securities supports the recent research findings regarding *ex post* quality. Collectively, the empirical evidence suggests that investors, on average, behaved rationally in pricing securities in the pre-Glass-Steagall era and concerns about exploitation of conflicts of interest are questionable – at least for the pre-Glass-Steagall 1927–29 period.[4]

The paper demonstrates that there are differences in (net) certification effects across different quality issues. Underwriters provide both distribution and certification services (see, for example, Smith, 1986). There are issues for which, *ex ante*, little certification is 'purchased', compared to issues where the demand for certification is high (for example, noninvestment-grade corporate bonds). The results of this paper suggest, that there is a higher net certification effect for more junior and information-sensitive securities.

The paper also examines whether the organizational form of bank participation influences the net certification effect of the bank. Banks could be allowed to underwrite corporate securities in-house through a department, or through a separate affiliate. This organization question has been central to the Glass-Steagall debate in the U.S. reform, in which current regulation focuses on 'organizational form' as a tool to reduce potential conflicts of interest. For example, banks are only allowed to underwrite corporate securities through Section 20 subsidiaries with extensive 'firewalls' between the parent holding company, the bank subsidiary, and the Section 20 subsidiary. The finding here is that in-house underwritings did not lead to greater conflicts of interest than underwriting though affiliates.

If banks specialize in a particular segment of the debt issue market, it is possible that bank underwritings have differential yields. Consequently, the paper examines whether segmentation of bank underwritings based on various characteristics influences the results. I do this by using selectivity methods to test whether the bank/investment-house pricing (yield) differentials discussed above hold after controlling for the endogeneity of the bank-underwriting decision. The findings confirm that corporate bank bonds are *ex ante* priced lower than investment-house-underwritten bonds, even after controlling for possible selectivity bias.

The paper is organized as follows. Section 2 describes sample selection and the data. Section 3 describes the methods and results for the basic test. Section 4 examines the certification effect in subsamples. Section 5 concludes.

[4]Similar issues are examined for the post-Glass-Steagall era, after 1990, by Gande, Puri, Saunders, and Walters (1995).

2. Sample selection and data

The data are collected with the following considerations in mind:

(1) The data must be drawn from a period when banks and investment houses were both allowed to underwrite securities. For this purpose, I use a unique data set whose security issues originated in a three-year period, 1/1/27–9/30/29. This period is after the McFadden Act of 1927, which allowed national banks to underwrite securities, and before the Glass-Steagall Act of 1933, which effectively prohibited commercial banks from underwriting corporate securities. Further, this period avoids securities issued during the Great Depression and the crash of October 1929. Focusing on this narrow time-frame ensures broad uniformity in economic conditions, prevailing investor sentiment, and regulatory conditions between banks and investment houses.

(2) It is necessary to control for factors such as size of issue, age of firm, and the underlying security and credit rating associated with an issue to ensure that these factors are not driving any difference in pricing. The data collected ensure that the sample allows for measurement of these factors. Further, selectivity models (see Heckman, 1979; Maddala, 1983) are used to control for factors that may be linked to the underwriter type. This econometrically formalizes a control group and isolates the information effect of a bank underwriting the issue.

The data are from a variety of publications. The sample of industrial bonds, preferred stock, and foreign government bond issues from January 1927 to September 1929 is from the *Commercial and Financial Chronicle*, which lists all securities issued every month. To ensure a sample in which uniform comparisons of price can be made across all securities, all offers of securities made jointly with common stock, issues with warrants, or convertibility provisions are excluded. In some cases, there is no mention of whether the security is convertible or has warrants, in which case the Moody's manuals were checked for such provisions. The final sample includes only those issues that both *Commercial and Financial Chronicle* and Moody's indicate were straight issues, and for which the coupon/dividend rate, offer price, and yield to maturity were available.

Sources of data on firm and issue characteristics for the sample include the *Commercial and Financial Chronicle*; Moody's, Fitch, and Poor's manuals; National Bond Summary; and National Stock Summary. The size of the issue, offering price, yield to maturity, purpose of the issue, sector (for example, industrial or foreign government), and the syndicate members offering the issue are taken from the *Commercial and Financial Chronicle*. The *ex ante* credit rating of an issue, the underlying security and call characteristics, and balance sheet data, where available, are taken from Moody's manuals. Where information is missing or ambiguous, it is supplemented by information taken from Poor's manuals, Fitch manuals, National Bond Summary, and National Stock Summary. The final sample contains 183 industrial bonds, 101 industrial preferred stock, and 105 foreign government bonds.

Because this study examines the differences in *ex ante* yields of bank and investment-house underwritings, the way *bank* underwritings and *yield* is defined is critical. Commercial banks are identified by using the following procedure. An initial list of affiliates given in White (1986) is taken from the Security Dealers of North America (1929), and names given in Peach (1941) and Carosso (1970) are added to this list. Further checks are made of any institutions appearing as underwriters with the words 'bank', 'national', 'trust', 'first', and 'securities company' in their names, in Moody's bank and finance manual, 1929. A bank is any institution appearing in this manual that either has a national or state charter, or engages in general banking activities, or has cross-holdings (that is, is a subsidiary or affiliate) with organizations engaged in such activities. This definition is similar to that used in Kroszner and Rajan (1994). Any underwriting in which the sole or the lead underwriter is a commercial bank, trust, or affiliate (henceforth, 'bank') is defined as a bank underwriting.

The premium yield to maturity (henceforth yield) is the dependent variable and is critical to finding evidence of the impact of a bank underwriting the issue. It is defined as the premium of *ex ante* yield to maturity of the security at the time of the issue (as given in *Commercial and Financial Chronicle*) over the *ex ante* yield to maturity of government bonds of nearest maturity issued in the same month. The *ex ante* yields of intermediate and long-term government bonds is taken from the Ibbotson database. For preferred stock, yields are adjusted by the long-term government bond yield.

In the eyes of an investor, does the presence of a bank as an underwriter add value to an issue? The tests below are designed to answer this question.

3. The basic test – Methods and results

The basic null hypothesis is:

H_0: *Yields for bank underwritings do not differ significantly from those of investment-house underwritings.*[5]

[5]Data on the underlying lending structure is not available. However, this biases the results towards the null hypothesis in the following manner: If, in this sample, banks did not lend to any of the underwritten firms, then neither banks nor investment houses have any information available from prior lending and also have no conflict of interest in terms of incentives to misrepresent true firm value stemming from outstanding bad loans to the firm. There should, therefore, be no difference in the pricing of underwritten securities. The results of banks lending to only some of the firms in the sample, would be weak differences in pricing. The data is therefore biased against finding any results and towards the null hypothesis. Further, additional tests are formulated to distinguish between certification and conflict of interest effects versus alternate reasons for price differences. For example, if pricing differentials of bank and investment-house underwritings come from banks having a comparative advantage in distribution, then these differences should also exist in foreign government bonds, which is not found to be the case.

3.1. Univariate tests – Methods and results

To test if a bank as the underwriter is associated with a lower yield, I compare the mean yields of bank and investment-house underwritings across categories. A two-tailed t-test and nonparametric Wilcoxon test is used to measure whether the differences in yields across categories are significant.

Table 1 shows our tests for H_0, and shows that for industrial bonds the mean yield for bank underwritings is 2.49%, which is 18 basis points lower than that of investment-house underwritings of 2.67%, significant at 2.5%. Table 1, panel B, shows a similar result for preferred stock, with the mean yield of bank underwritings at 3%, which is 37 basis points lower than the investment-house underwriting mean yield of 3.37%. The difference is significant at 1%. For both industrial bonds and preferred stock, the difference is also significant by the Wilcoxon test at 1%. As a measure of economic significance, the difference in yield premiums for all Ba- and Baa-rated bonds in the full sample is eight basis points. Hence, bank underwritings have lower yields than investment-house underwritings. This difference appears significant both economically and statistically.

Table 1
Univariate tests for differences in bank- and investment-house-underwritten firm/issue characteristics

The table tests if bank- and investment-house-underwritten issues differed significantly in terms of firm/issue characteristics, using a difference in means t-test and Wilcoxon rank test. The variables given are defined as follows: LN(*AMOUNT*) is the natural log of the offered dollar amount of the issue (in \$m), LN(*SYNDICATE SIZE*) is the natural log of the number of underwriters of the issue, LN(*AGE*) is the natural log of the age of the firm in years taken from the date of incorporation, *YIELD* is the premium of the *ex ante* yield of the security over the *ex ante* yield of a government bond of nearest maturity issued in the same month. Bank denotes the group for which the issue is lead-managed by a bank, and investment house denotes the group not lead-managed by a bank.

Variable	Investment-house mean	Sample size	Bank mean	Sample size	t-test	Wilcoxon test p-value
Panel A: *Industrial bonds*						
YIELD	2.6698	110	2.4911	73	2.48[b]	0.0098[a]
LN(*AMOUNT*)	0.3747	110	0.5151	73	−0.65	0.5335
LN(*SYNDICATE SIZE*)	0.5421	110	0.7089	73	−1.64	0.2007
LN(*AGE*)	1.0794	109	1.7371	72	−2.02[c]	0.0486[c]
Panel B: *Preferred stocks*						
YIELD	3.3731	77	3.0	24	2.84[a]	0.0041[a]
LN(*AMOUNT*)	0.1043	77	0.4329	24	−0.96	0.5207
LN(*SYNDICATE SIZE*)	0.5015	77	0.7803	24	−1.63	0.1399
LN(*AGE*)	1.6876	74	1.8347	23	−0.28	0.3916

[a,b,c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test.

We must be cautious in interpreting these unconditional results. A brief examination of other important characteristics shows that a number of them (particularly age of the firm, number of syndicate members, whether the issue is seasoned, and whether the security is secured) differ significantly for bank and investment house issues (see Tables 1 and 2). It is therefore necessary to control for the characteristics that create important differences between bank and investment-house underwritings.

3.2. *Multivariate tests – Methods and results*

Differences in the yield of bank and investment-house underwritings, after controlling for other factors, is measured by estimating the following Ordinary Least Squares (OLS) regression:

$$\begin{aligned} YIELD_i = {} & \beta_0 + \beta_1 INVGRADE_i + \beta_2 \mathrm{LN}(AMOUNT)_i \\ & + \beta_3 \mathrm{LN}(SYNDICATE\ SIZE)_i + \beta_4 NEW\ ISSUE_i \\ & + \beta_5 EXCHANGE_i + \beta_6 SECURED_i + \beta_7 \mathrm{LN}(AGE)_i \\ & + \beta_8 BANK_i . \end{aligned} \tag{1}$$

Table 2
Tests of independence of bank underwritings and characteristics using contingency tables

The table below tests if bank underwritings were independent of issue-specific characteristics. For ease of exposition, instead of presenting a 2-by-2 contingency table for each characteristic under the column 'association with bank underwritings', I symbolise whether, for banks, the observations > expected value by G and observations < expected value by L. The test statistic is a chi-square test under the null hypothesis of independence of bank underwritings and the characteristic in question. *NEW ISSUE* is a dummy variable, which is 1 if the issue is a first-time issue. *EXCHANGE* is a dummy variable, which is 1 if the issue is listed on an exchange. *INVGRADE* is a dummy variable, which is 1 if the issue is investment grade. *SECURED* is a dummy variable, which is 1 if the issue is secured. All dummy variables are 0 otherwise.

Characteristic	Investment-house underwriting proportions	Sample size	Bank underwriting proportions	Sample size	Association with bank underwritings	*p*-value
Panel A: *Industrial bonds*						
NEW ISSUE	84.55%	110	67.12%	73	L	0.0056[a]
EXCHANGE	19.09%	110	26.03%	73	G	0.2662
INVGRADE	20.91%	110	28.77%	73	G	0.2232
SECURED	73.64%	110	50.68%	73	L	0.0015[a]
Panel B: *Preferred stocks*						
NEW ISSUE	67.53%	77	75.00%	24	G	0.4886
EXCHANGE	41.56%	77	20.83%	24	L	0.0658
INVGRADE	18.18%	77	16.67%	24	L	0.8655

[a, b, c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test

The variables are:

YIELD: The dependent variable in the study defined as the premium of stated *ex ante* yield to maturity of the security over the *ex ante* yield to maturity of government bonds of nearest maturity issued in the same month.
INVGRADE: A dummy variable that takes the value one if the security is investment-grade, zero otherwise. A security is taken be investment-grade if it is rated Baa or above (as given in Moody's) and noninvestment-grade if it is either not rated, or rated below Baa.
LN(*AMOUNT*): The natural log of the dollar amount of the security issue underwritten in $ millions.
LN(*SYNDICATE SIZE*): The log of the number of underwriters in the syndicate handling the issue.
NEW ISSUE: A dummy variable that takes the value one if there are no similar securities issued by the firm outstanding in the marketplace, zero otherwise.
EXCHANGE: A dummy variable that takes the value one if the security is listed on an exchange, zero otherwise.
SECURED: A dummy variable that takes the value one if the security is secured, zero otherwise.
LN(*AGE*): The natural log of the age of the firm in years (when the age of the firm is less than one year, the fraction of the year in which the firm was incorporated is taken as the firm's age).
BANK: A dummy variable that takes the value one if a bank is the lead or sole underwriter, zero otherwise.

The impact of bank underwriting on issue yield is measured by the size and the significance of the coefficient of the *BANK* dummy variable. Other independent variables control for credit rating, size of issue, number of underwriters, whether it is a new issue, whether the security is listed on an exchange, the underlying security for the issue, and age of the firm. These factors are relevant for the following reasons: higher credit ratings should lead to lower yields; larger offerings are associated with less uncertainty than smaller issues, and may have more public information; greater syndication abilities or distribution power should reduce yield. Whether the issue is new or seasoned is important, since there is more uncertainty about a new than a seasoned issue, and this can lead to a reduction in yield. Exchange listing of the security is important because there is likely to be more information for, and liquidity of, a security that is listed on an exchange. Similarly, the purpose of the issue and the underlying collateral should influence the yield. However, given the absence of stringent disclosure laws (such as those passed in the 1934 Securities Exchange Act) there is considerable noise in the stated purpose. The age of the firm is important, because past studies link lower age to greater uncertainty about the firm's prospects and such uncertainties can influence yield.

The reputation of the underwriter can influence yield. Since there is no easy measure of reputation, two measures are constructed. One is based on the market share of the underwriter. This was computed by hand-tabulating all the public issues made in 1928 (January to November 1928) and summing the volume of underwritings made by different underwriters. (Over 600 underwriters were found and their market share tabulated.) A dummy variable is created that takes the value of one when the underwriter has a large market share (greater than 0.25% of the total market), and zero otherwise. The second is based on the median size of the issue (as used by Kroszner and Rajan, 1994). A large underwriter is one whose median underwriting is greater than $5 million, a small underwriter is one whose median underwriting is less than $1 million. Table 3 presents the multivariate tests which include independent variables based on the latter definition of reputation. Table 3 shows that the inclusion of such a reputation measure does not qualitatively change the results for bank influence on yield, as reflected in the magnitude and significance of the coefficient of the *BANK* dummy variable.

Similar results are found when a reputation variable based on market share is used (not reported in tables). Both reputation measures are highly correlated with the size of the issue for corporate securities. Size seems to act as a crude proxy for reputation. The reputation measure is hence omitted from future reported estimations (though the results for the additional test propositions, described later, in terms of the size and significance of the *BANK* dummy variable are similar when the reputation variable is included).

The multivariate tests show that two of the independent variables that are significant in reducing yield are a higher credit rating and larger size of the issue. The most important variable for my purpose is the *BANK* dummy variable. The last row in Table 3 shows that the coefficient of the *BANK* dummy variable is -0.13 for industrial bonds, significant at 5%, and -0.37 for preferred stock, significant at 1%. This shows that bank underwritings significantly reduced yield for both industrial bonds and preferred stock. The results are similar to those obtained from the univariate tests and support the hypothesis that banks have a higher net certification effect over that of investment houses.

I further conducted several checks for biases. White's test did not indicate heteroscedasticity in the data. There is also a need to check if differences in maturity, timing, and call provisions influence the results. The average time to maturity for industrial bonds is 14.5 years for banks and 15.5 years for investment-house underwritings. This difference is not statistically significant. I further checked that time to maturity is not a significant independent determinant of yields by including a dummy variable for long-term bonds (of maturity greater than 15 years) in the regressions (neither intermediary issued short-term industrial bonds of less than five-year maturity). The results are qualitatively similar to those reported in the tables for the multivariate tests. To test for the

Table 3
Multivariate tests for bank and investment-house underwritings

The table below gives the OLS estimates of the following equation:

$$YIELD_i = \beta_0 + \beta_1 INVGRADE_i + \beta_2 \text{LN}(AMOUNT)_i + \beta_3 \text{LN}(SYNDICATE\ SIZE)_i + \beta_4 NEW\ ISSUE_i + \beta_5 EXCHANGE_i + \beta_6 SECURED_i + \beta_7 \text{LN}(AGE)_i + \beta_8 BANK_i$$

The dependent variable is $YIELD_i$, which is the premium of the *ex ante* yield of security i over the *ex ante* yield of a government bond of nearest maturity issued in the same month. The independent variables are: *INVGRADE* is a dummy variable, which is 1 if the issue is investment-grade. LN(*AMOUNT*) is the natural log of the offered dollar amount of the issue (in $m). LN(*SYNDICATE SIZE*) is the natural log of the number of underwriters of the issue. *NEW ISSUE* is a dummy variable, which is 1 if the issue is a first-time issue. *EXCHANGE* is a dummy variable, which is 1 if the issue is listed on an exchange. *SECURED* is a dummy variable, which is 1 if the issue is secured. LN(*AGE*) is the natural log of the age of the firm in years taken from the date of incorporation. *SMALL ISSUER* is a dummy variable, which is 1 if the underwriter had a median issue size of less than $1 million. *LARGE ISSUER* is a dummy variable, which is 1 if the underwriter had a median issue size of greater than $5 million. *BANK* is a dummy variable, which is 1 if the lead underwriter is a bank. All dummy variables are 0 otherwise.

Variable	Coefficient	*T*-ratio	Coefficient	*T*-ratio
Panel A: *Industrial bonds*				
Constant	2.7050	27.453[a]	2.6958	25.645[a]
INVGRADE	− 0.13307	− 1.763	− 0.13305	− 1.745
LN(*AMOUNT*)	− 0.20533	− 6.797[a]	− 0.19531	− 4.489[a]
LN(*SYNDICATE SIZE*)	0.08805	1.675	0.08451	1.560
NEW ISSUE	− 0.09106	− 1.252	− 0.09028	− 1.233
EXCHANGE	0.14720	1.774	0.14293	1.690
SECURED	0.12282	1.869	0.12395	1.872
LN(AGE)	− 0.01737	− 1.249	− 0.01753	− 1.248
SMALL ISSUER			0.02627	0.299
LARGE ISSUER			− 0.01109	− 0.129
BANK	− 0.12711	− 1.984[c]	− 0.12589	− 1.933[c]
Observations		181		
	Adjusted $R^2 = 0.3241$		Adjusted $R^2 = 0.3166$	
Panel B: *Preferred stock*				
Constant	3.5170	32.888[a]	3.4234	30.481[a]
INVGRADE	− 0.31745	− 2.512[a]	− 0.35619	− 2.943[a]
LN(*AMOUNT*)	− 0.17481	− 3.999[a]	− 0.02148	− 0.350
LN(*SYNDICATE SIZE*)	0.08746	1.209	0.11359	1.631
NEW ISSUE	− 0.01164	− 0.123	− 0.02780	− 0.308
EXCHANGE	− 0.11960	− 1.173	− 0.14693	− 1.496
LN(*AGE*)	− 0.03415	− 1.623	− 0.03652	− 1.821
SMALL ISSUER			0.29280	2.600[a]
LARGE ISSUER			− 0.44435	− 2.570[a]
BANK	− 0.37210	− 3.513[a]	− 0.36342	− 3.592[a]
Observations		97		
	Adjusted $R^2 = 0.3903$		Adjusted $R^2 = 0.4494$	

[a,b,c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test.

effect of timing, a timing dummy variable for year of issue is incorporated into the industrial bond regressions. The results are again qualitatively similar.

Several checks were done to check for the influence of call provisions. There is scope for measurement error arising, for example, from corporates being callable while governments are not. Two robustness checks are made for measurement errors. First, the multivariate tests with the *BANK* dummy variables are estimated with raw yield to maturity. The results for the null hypothesis are in the same direction, though the significance is weakened. Second, for the first seven years from the issue, the year in which the bond was called is taken to be the effective maturity of the bond. The yield is then adjusted with government bond yields of nearest maturity and the multivariate test is rerun. The results for the null hypothesis are qualitatively similar. A further check is done for differences in call provisions between bank and investment-house underwritings. While there is no easy way to control for such differences, controls and checks for the direction of bias are made in two ways. First, to control for differences in call provisions, the number of years to the call date is examined (information for call provisions is taken from Moody's manuals). Note, over 95% of bonds are callable for both banks and investment houses. Further, the average bank and investment-house corporate bond underwritings do not differ significantly in terms of time to call (on average, both underwritings are callable within a year). Second, the initial call price for bank and investment-house underwritings is compared. For industrial bonds, bank underwritings had a significantly lower mean call price of 102.5 as compared to investment house's mean call price of 103.6. Insofar as a lower call price means the probability of the bond being called is higher, this should bias the results towards finding that bank underwritings have lower prices (higher yields) because of lower call prices. The measurement bias is, thus, in the opposite direction of this paper's findings and hence actually strengthens the results.

These results raise the following related question: If initial yields are lower for bank-underwritten issues, why do firms go to investment-house underwriters at all? There are several possible explanations. First, offer yields may be poor proxies for the overall cost of issuing securities. To ascertain the true benefit to firms, we must examine not just the prices obtained for the firms' securities, but also the underwriting fees. Data on fees is unavailable, hence this study is restricted to the price aspect alone. Second, banks may specialize in a particular segment of the market, thus making it appear that bank underwritings lead to lower yields. A formal test of whether banks are more likely to underwrite bonds is conducted by running a probit with bank underwritings as the dependent variable and the other characteristics defined in this section as independent variables. A dummy variable, *BOND*, is included as the independent variable, which is one if the security issued is an industrial bond, and zero otherwise. The coefficient of this variable is 0.44, significant at 1% (not reported in the tables). The results indicate that banks are more likely to underwrite industrial bonds

than preferred stock. There are at least four possible explanations for this result. Kroszner and Rajan (1994), who find a similar result, advance the explanation that banks deliberately underwrote less information sensitive securities so as to minimize potential conflicts of interest. Another explanation is that banks have more expertise in debt than other forms of securities, hence their underwritings are concentrated in bonds. Further, there is also a potential legal explanation in that under the McFadden Act of 1927, the Comptroller initially allowed only bond underwritings but only later approved underwriting of certain equity issues as well (see Flannery, 1985). This may have inhibited banks from underwriting nondebt issues. Last, banks may have had more distribution power than investment houses, hence they may have been at a competitive advantage in attracting larger, syndicated issues. Because the average corporate bond issue size was larger ($4.08m) than the average preferred stock issue size ($2.84m) this could explain the bias in bank underwritings towards bonds.[6] This bias is partially controlled by running regressions for corporate bonds and preferred stock separately. However, the segmentation of bank underwritings could also be based on other characteristics, and I also need to control for this possibility.

3.3. *Probit tests – Methods and results*

The significant factors that decide whether an issue is bank-underwritten are determined through a probit regression of the *BANK* dummy variable on a set of independent variables. The probit regressions for industrial bonds show that bank-underwritten issues are more likely for seasoned issues, for older firms with less underlying collateral, and where there is a larger number of underwriters in the syndicate (see Table 4, panel A). This is consistent with banks having large distribution networks that can provide a comparative advantage in handling large, syndicated issues. This also indicates that bank underwritings are segmented on issue and firm characteristics.

Insofar as firm and issue characteristics do seem to impact bank-underwritten issues, it is necessary to control for this 'selection bias' which I do by using selectivity methods described below.

3.4. *Selectivity bias adjustments*

It is necessary to account for the fact that the bank-underwriting decision is endogenous, dependent on firm characteristics. It is well-known in econometric literature that coefficient estimators in a dummy variable linear regression

[6]My data excludes common stock issues of which very few were underwritten by banks. Tinic's (1988) sample of new equity issues (which he graciously sent to me) shows only five equity issues were underwritten by banks in the entire period 1921–29.

Table 4
Selectivity bias adjustments – bank and investment-house underwritings

Panel A: *Probit estimations*

This table presents results of probit regressions. The dependent variable is a dummy variable, *BANK*, assigned the value 1 if the lead or sole underwriter is a bank, 0 otherwise. The independent variables used in the two panels below are: *INVGRADE* is a dummy variable, which is 1 if the issue is investment-grade. LN(*AMOUNT*) is the log of the offered dollar amount of the issue (in $m). LN(*SYNDICATE SIZE*) is the log of the number of underwriters of the issue. *NEW ISSUE* is a dummy variable, which is 1 if the issue is a first-time issue. *EXCHANGE* is a dummy variable, which is 1 if the issue is listed on an exchange. *SECURED* is a dummy variable, which is 1 if the issue is secured. LN(*AGE*) is the natural log of the age of the firm in years taken from the date of incorporation. All dummy variables are 0 otherwise. Pseudo R^2 is the likelihood ratio computed as $R^2 = 1 - \log L/\log L_0$ where $\log L$ is the maximized value of the log-likelihood function, $\log L_0$ is the log-likelihood computed only with a constant term. The estimation was also conducted with the full set of independent variables. The results are qualitatively similar with coefficient of *BKINFO* being negative at similar levels, but the regression fit is poorer.

Panel B: *Estimates of the second-stage regression*

The dependent variable is $YIELD_i$, which is the premium of the *ex ante* yield of security *i* over the *ex ante* yield of a government bond of nearest maturity issued in the same month. The equation being estimated is $YIELD_i = \beta_0 + \beta_1 INVGRADE_i + \cdots + \beta_8 BKINFO_i$, where estimates of *BKINFO* are obtained from the probit regressions.

Industrial bonds			Preferred stock		
Variable	Coefficient	*T*-ratio	Variable	Coefficient	*T*-ratio
Panel A					
Constant	0.31937	1.132	*Constant*	− 0.73409	− 3.308[a]
LN(*AGE*)	0.08661	1.871	LN(*AMOUNT*)	0.14675	1.051
LN(*SYNDICATE SIZE*)	0.25680	1.678	LN(*SYNDICATE SIZE*)	0.41600	1.728
NEW ISSUE	− 0.60823	− 2.613[a]	*EXCHANGE*	− 0.87930	− 2.370[b]
SECURED	− 0.62586	− 3.067[a]			
	p-value = 0.000		*p*-value = 0.023		
	Pseudo R^2 = 0.096		Pseudo R^2 = 0.090		
Panel B					
Constant	2.6254	29.512[a]	*Constant*	3.4230	33.164[a]
INVGRADE	− 0.13292	− 1.809	*INVGRADE*	− 0.32115	− 2.647[a]
LN(*AMOUNT*)	− 0.20547	− 6.979[a]	LN(*AMOUNT*)	− 0.19093	− 4.344[a]
LN(*SYNDICATE SIZE*)	0.07665	1.494	LN(*SYNDICATE SIZE*)	0.04014	0.553
NEW ISSUE	− 0.06281	− 0.892	*NEW ISSUE*	− 0.00614	− 0.067
EXCHANGE	0.14715	1.820	*EXCHANGE*	− 0.03132	− 0.311
SECURED	0.15175	2.405[b]	*SECURED*		
LN(*AGE*)	− 0.02095	− 1.542	LN(*AGE*)	− 0.03347	− 1.670
BKINFO	− 0.07945	− 2.103[c]	*BKINFO*	− 0.21828	− 3.799[a]
Observations	181			97	
	Adjusted R^2 = 0.3251			Adjusted R^2 = 0.3916	

[a, b, c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test.

model (as in the multivariate tests above) are inconsistent when the dummy variable is endogenous (see, for example, Greene, 1993; Maddala, 1983).

One way of controlling for potential segmentation is to standardize all other factors by forming a control group. There are several problems in doing this: the use of subjective criteria, the inevitability that some of the original sample has to be omitted which leads to a loss of information, and the question that when there are multiple criteria considered *ex ante* important and a limited universe, how much can we relax the criteria to obtain an adequate sample size for the control group.

As an example, for preferred stock, the 24 bank-underwritten issues are matched with investment-house-underwritten issues on one criterion, the age of the firm. Only 22 out of the original sample can be matched within a range of five years. Adding the criterion of whether the issue is investment grade or not results in the loss of an additional two issues. Attempts to match on other criteria (such as size of the issue, exchange listing, etc.) can result in very few closely matching issues. To obtain a larger sample, the criteria may have to be relaxed substantially, which casts doubt on whether the controls for any of the factors are adequate. These problems are avoided by determining econometrically which factors are important, and by formalizing a control group (without loss of information) using selectivity methods.

3.4.1. Selectivity adjustments – Methods and results

The bank's decision to underwrite or not is endogenous and depends on its private information. The market cannot observe this information directly, but can partially extract it. The market has rational expectations of this information: It uses the bank's underwriting decision to update its expectations of the bank's private information. This update is the conditional expectation of the bank's private information, given its underwriting decision, and is denoted $BKINFO_E$. This can be interpreted as the information revealed by the bank's underwriting. (The technical derivation of this variable and a detailed description of the estimation procedure appear in the Appendix.) In effect, the dummy variable $BANK$ in the multivariate test

$$YIELD_i = \beta_0 + \beta_1 INVGRADE_i + \cdots + \beta_8 BANK_i \tag{2}$$

is now replaced by $BKINFO_E$, so that the equation being estimated is

$$YIELD_i = \beta_0 + \beta_1 INVGRADE_i + \cdots + \beta_8 BKINFO_E . \tag{3}$$

If the bank's private information enhances the quality of the issue, it will result in higher prices (or lower yields), and the coefficient of $BKINFO$ will be negative (subscript E henceforth dropped from $BKINFO_E$ for notational convenience). The direction and strength of the information effect on yield will thus be reflected in the magnitude and significance of w, the $BKINFO$ coefficient.

The estimation is done using Heckman's two-step method. The last row of Table 4, panel B, shows that for industrial bonds the coefficient of *BKINFO* is −0.08, significant at 5%, while for preferred stock it is −0.22, significant at 1% (maximum likelihood estimation also produces negative coefficients for *BKINFO*). This supports the idea that the information revealed by bank underwriting adds positive value to the issue, enhancing its price and decreasing its yield, on average by eight basis points for corporate bonds and 22 basis points for preferred stock.

Higher prices could arise from other explanations, for example, better distribution power of banks versus investment houses, since both distribution and certification services are provided by the underwriter (see, for example, Smith, 1986). In the next section I control for factors relating to distribution services by focusing on subsamples where the derived demand for certification is likely to be high.

4. Certification effect in subsamples

My finding that bank underwritings have lower yields than nonbank underwritings is a result that could be attributed to other explanations. To ensure that the incentive effects described (certification effect versus conflict of interest effect) are driving the results, I formulate additional test propositions. The value of bank certification is highest when banks have access to more private information than do investment houses. Accordingly, cases in which a more pronounced certification effect is expected are examined below.

4.1. Foreign government bonds versus industrial bonds (corporate bonds)

It is well documented that underwritings for foreign government bond issues were highly competitive (see, for example, Mintz, 1951).[7] Such issues were likely

[7] Mintz (1951, pp. 65–67) describes the keen competition in the period 1926–29 for bankers floating foreign loans in the market. He quotes hearings held by the Senate Committee on the 'Sale of foreign bonds or securities in the U.S.' where there are examples of high-pressure salesmanship such as up to 29 representatives of American financial houses being in Columbia at one time competing for a loan. The intense competitiveness of the foreign government bond market seems to have induced effects in the opposite direction to that discussed above, with national banks sometimes participating in lending to support on-going investment banking activities. One such transaction was loans given by Chase National Bank to the Republic of Cuba to assist its affiliate, Chase Securities Corporation, which headed a syndicate that underwrote bonds for a public works program in Cuba three times (see Peach, 1941, pp. 138). Such transactions gave rise to the criticism that combining commercial and investment banking increased the riskiness of banks and endangered the solvency of the banking system as a whole. This issue is not studied in this paper but has been examined by, for example, White (1986), who finds that the riskiness of banks engaged in commercial and investment banking was not higher than those occupied solely in investment banking.

to have more demand for distribution, rather than certification, services. Further, prior lending relationships appeared to be of little importance in securing business in this competitive market. If distribution-related factors are controlled, there is no reason for bank-underwritten issues to differ in pricing from investment-house-underwritten issues. By contrast, the derived demand for certification is likely to be higher for domestic bond issues where prior lending relationships were important. To test for these incentive effects, I use the foreign government bond issues as a control group, and compare the results obtained with those for industrial bonds.

As Table 1 shows, there is a difference in yields between bank and investment-house underwritings for industrial bonds and preferred stock. However, this is not true for foreign government bonds (see Table 5, panel A). The mean yields on bank underwritings of industrial bonds and preferred stock differ significantly from that of investment-house underwritings' mean yield, with the difference being significant by both the t-test and the Wilcoxon test. However, foreign government bonds show no significant difference in mean yields between bank- and investment-house-underwritten securities.

These results are supported by the multivariate tests seen earlier in Table 3. The bank dummy variable coefficient is found to be negative and statistically significant for industrial bonds and preferred stock. Again, this is not true for foreign government bonds (see Table 5, panel B). These results are supported by the selectivity-adjusted estimates seen in Table 4, which show that the coefficient on the *BKINFO* variable is negative and significant for both industrial bonds and preferred stock, but not for foreign government bonds (not reported in tables). The univariate tests, multivariate tests, and selectivity adjustments support the conclusion that the presence of a bank as underwriter significantly lowers yields for both corporate bonds and preferred stock, but not for the control group (foreign government bonds), which was characterized by much competition among banks and investment houses and little demand for certification services. If the difference in pricing found in corporate bonds and preferred stock was a result of different reasons, such as better distribution power of banks, we should have seen a similar difference in pricing in foreign government bonds.

4.2. Industrial bonds versus industrial preferred stock

Preferred stock is junior, and therefore riskier than bonds. It is more sensitive to information that can affect firm value, and likely has a higher derived demand for certification. Bank underwritings should lead to a greater reduction in yield for preferred stock compared to industrial bonds.

The mean difference in yield on bank underwriting versus investment-house underwriting for industrial bonds is 18 basis points; it is much larger (37 basis points) for preferred stock. The multivariate and selectivity tests (seen in

Table 5
Univariate and multivariate tests for foreign government bonds

Panel A: *Univariate tests*

This table tests if bank- and investment-house-underwritten issues differed significantly in terms of yield, using a difference in means t-test and Wilcoxon rank test. The dependent variable is $YIELD_i$, which is the premium of the *ex ante* yield of security i over the *ex ante* yield of a government bond of nearest maturity issued in the same month.

Panel B: *Multivariate tests*

This panel gives the OLS estimates of the following equation:

$$YIELD_i = \beta_0 + \beta_1 INVGRADE_i + \beta_2 \text{LN}(AMOUNT)_i + \beta_3 \text{LN}(SYNDICATE\ SIZE)_i + \beta_4 NEW\ ISSUE_i + \beta_5 EXCHANGE_i + \beta_6 BANK_i$$

The dependent variable is $YIELD_i$, which is the premium of the *ex ante* yield of security i over the *ex ante* yield of a government bond of nearest maturity issued in the same month. The independent variables are: *INVGRADE* is a dummy variable, which is 1 if the issue is investment-grade. LN(*AMOUNT*) is the natural log of the offered dollar amount of the issue (in \$m). LN(*SYNDICATE SIZE*) is the natural log of the number of underwriters of the issue. *NEW ISSUE* is a dummy variable, which is 1 if the issue is a first-time issue. *EXCHANGE* is a dummy variable, which is 1 if the issue is listed on an exchange. *SMALL ISSUER* is a dummy variable, which is 1 if the underwriter had a median issue size of less than \$1 million. *LARGE ISSUER* is a dummy variable, which if 1 is the underwriter had a median issue size of greater than \$5 million. *BANK* is a dummy variable, which is 1 if the lead underwriter is a bank. All dummy variables are 0 otherwise.

Panel A

Variable	Investment house mean	Sample size	Bank mean	Sample size	t-test	Wilcoxon test p-value
YIELD	3.4098	68	3.1851	37	1.21	0.4189

Panel B

Variable	Coefficient	t-ratio	Coefficient	t-ratio
Constant	4.0257	17.835[a]	4.0296	17.043[a]
INVGRADE	− 0.64325	− 3.237[a]	− 0.65579	− 3.209[a]
LN(*AMOUNT*)	− 0.13175	− 1.393	− 0.11141	− 1.016
LN(*SYNDICATE SIZE*)	− 0.08035	− 0.598	− 0.08231	− 0.605
NEW ISSUE	0.23502	0.900	0.24637	0.928
EXCHANGE	0.25827	1.216	0.26505	1.229
SMALL ISSUER			− 0.00317	− 0.004
LARGE ISSUER			− 0.07890	− 0.398
BANK	− 0.13930	− 0.821	− 0.13049	− 0.755
Observations		105		
	Adjusted $R^2 = 0.1166$		Adjusted $R^2 = 0.0997$	

[a,b,c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test.

Tables 3 and 4) support this result. The *BKINFO* coefficient is −0.08 for industrial bonds, significant at 5%, and −0.22 for preferred stock, significant at 1%. This difference is statistically significant when a Wald test is used. These results (higher differential yield for preferred stock versus industrial bonds) support that bank underwritings have a larger certification effect than investment-house underwritings. The results are more pronounced for junior securities.

4.3. New versus seasoned offerings

New issues are associated with a large degree of uncertainty. Since less public information is available than for seasoned issues, the derived demand for certification is likely to be higher for new issues.

It is not possible to ascertain from the data sources available whether a particular issue is the firm's first public debt/preferred stock issue. However, I am able to determine whether the firm has any other public debt or preferred stock issues outstanding at the time. If there are no such issues outstanding, I classify the issue as a new issue.

The univariate tests for the hypothesis that bank underwritings will have a stronger influence for new, rather than seasoned issues are given in Table 6, panels A and B. These tests show that for new industrial bond issues, the mean yield for bank-underwritings is 2.40%, 27 basis points lower than the mean yield for investment-house-underwritten issues, significant at 1% by both *t*-test and Wilcoxon test. The mean yield for seasoned underwritings is not significantly different between bank- and investment-house-underwritten issues. When examining the same tests for preferred stock, the Wilcoxon test finds the yield of bank underwritings is significantly less than that of investment-house underwritings for both seasoned and new issues (see Table 6). The multivariate tests (not reported in tables) show a larger magnitude and significance of the coefficient of the bank dummy for new (as against seasoned) offerings for industrial bonds. Thus, after controlling for other factors, bank underwritings led to a 14-basis-point reduction in yield for new issues of industrial bonds, and a 34-basis-point reduction in yield for new issues of preferred stock, which is statistically significant. There is no reduction in yield for seasoned industrial bond issues, and a 30-basis-point reduction in yield for seasoned preferred stock issues, which is statistically insignificant. Similar results supporting the hypothesis that bank underwritings have a stronger impact on yields for new, rather than seasoned, issues are obtained in the selectivity tests (not reported in tables). The coefficient of *BKINFO* is −0.08 for new issues, significant at 5%, as compared to −0.0 for seasoned issues, which is statistically insignificant. Similarly, for preferred stock, the coefficient of *BKINFO* is −0.20 for new issues, significant at 1%, as compared to −0.15 for seasoned issues, which is statistically insignificant. The difference in *BKINFO* coefficients for new and

Table 6
Univariate tests for yields differences in subsamples

The table tests if there are differences in the yields of bank- and investment-house-underwritten corporate underwritings for new and seasoned issues, noninvestment- and investment-grade issues, and between investment-house and in-house/affiliate corporate underwritings using a difference in means t-test and Wilcoxon rank test. The dependent variable is *YIELD*, which is the premium of the *ex ante* yield of the security over the *ex ante* yield of a government bond of nearest maturity issued in the same month.

Panel A: *New issues*

Category	Investment-house mean	Sample size	Bank mean	Sample size	t-test	Wilcoxon test p-value
Industrial bonds	2.6697	93	2.3990	49	3.08[a]	0.00[a]
Preferred stock	3.3544	52	3.0822	18	1.92	0.03[c]

Panel B: *Seasoned issues*

Industrial bonds	2.6700	17	2.6791	24	−0.06	0.73
Preferred stock	3.4120	25	2.7533	6	2.09	0.05[c]

Panel C: *Noninvestment-grade issues*

Industrial bonds	2.7355	87	2.5899	52	1.95[c]	0.03[c]
Preferred stock	3.4752	63	3.0970	20	3.26[a]	0.00[a]

Panel D: *Investment-grade issues*

Industrial bonds	2.4213	23	2.2466	21	1.09	0.33
Preferred stock	2.9135	14	2.5150	4	0.81	0.22

Panel E: *In-house underwritings*

Category	Investment-house mean	Sample size	In-house mean	Sample size	t-test	Wilcoxon test p-value
Industrial bonds	2.6698	110	2.4392	34	2.35[b]	0.02[b]
Preferred stock	3.3731	77	2.8522	9	3.00[a]	0.00[a]

Panel F: *Affiliate underwritings*

Category	Investment-house mean	Sample size	Affiliate mean	Sample size	t-test	Wilcoxon test p-value
Industrial bonds	2.6698	110	2.5364	39	1.54	0.08
Preferred stock	3.3731	77	3.0886	15	1.65	0.10

[a,b,c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test.

seasoned issues for industrial bonds and preferred stock is in the direction hypothesized, indicating that the information revealed by bank underwritings significantly reduces the yield of corporate new issues, but not of seasoned issues. Thus, the presence of the bank as underwriter has more value for new, rather than seasoned, underwritings. This is consistent with my finding that bank underwritings have a higher impact on yield for junior securities (preferred stock) than for bonds. The results collectively support the bank's certification role being higher for junior and more information-sensitive securities.

4.4. *Noninvestment-grade securities versus investment-grade securities*

Noninvestment-grade securities require more scrutiny and information than do investment-grade securities if they are to receive good certification. Again, the derived demand for certification should be higher for noninvestment-grade securities.

Table 6, panels C and D, gives the univariate tests for this hypothesis. The table shows that for industrial bond noninvestment-grade securities, the mean yield of bank-underwritten issues is 2.59%, which is 15 basis points lower than that of investment-house-underwritten securities. This difference is significant at 5% by both the t-test and the Wilcoxon sign test. A similar result holds for preferred stock, in which the mean yield of bank-underwritten issues for noninvestment-grade securities is 37 basis points lower than that of investment-house-underwritten securities, significant at 1% by both the t-test and the Wilcoxon test. For investment-grade industrial bonds and preferred stock, there is no significant difference in yields for bank- and investment-house-underwritten issues. These results support a significantly higher difference in yields for bank-underwritten issues in noninvestment-grade securities as compared to investment-grade securities. Table 7 gives the multivariate estimates and shows that for industrial bonds[8] the magnitude of the bank dummy coefficient is similar for investment- and noninvestment-grade securities, but is significant at the margin only for noninvestment-grade securities. The selectivity tests for industrial bonds (not reported in tables) show that the information revealed by bank underwritings, reflected in the coefficient of *BKINFO*, reduces yields by eight basis points for noninvestment-grade securities, and is marginally lower in magnitude for investment-grade securities. It is statistically significant only for noninvestment-grade securities. While the difference in the coefficients is not large, the finding that the *BKINFO* variable is significant only for noninvestment-grade issues shows that the bank's role in securing lower yields is more important for noninvestment-grade, rather than investment-grade, issues.

[8]There are only four investment-grade securities underwritten by banks for preferred stock. Hence, I do not attempt to further split up the sample to control for other factors.

Table 7
Multivariate tests for noninvestment-grade/investment-grade issues, and bank in-house /affiliate underwritings

Panel A gives the following OLS estimates for investment-grade and noninvestment-grade industrial bonds:

$$YIELD_i = \beta_0 + \beta_1 \mathrm{LN}(AMOUNT)_i + \beta_2 \mathrm{LN}(SYNDICATE\ SIZE)_i + \beta_3 NEW\ ISSUE_i + \beta_4 EXCHANGE_i + \beta_5 SECURED_i + \beta_6 \mathrm{LN}(AGE)_i + \beta_7 BANK_i$$

Panels B and C give the following OLS estimates for industrial bonds and preferred stock, respectively:

$$YIELD_i = \beta_0 + \beta_1 INVGRADE_i + \beta_2 \mathrm{LN}(AMOUNT)_i + \beta_3 \mathrm{LN}(SYNDICATE\ SIZE)_i + \beta_4 NEW\ ISSUE_i + \beta_5 EXCHANGE_i + \beta_6 SECURED_i + \beta_7 \mathrm{LN}(AGE)_i + \beta_8 IN\text{-}HOUSE_i + \beta_9 AFFILIATE_i$$

The dependent variable is $YIELD_i$, which is the premium of the *ex ante* yield of security *i* over the *ex ante* yield of a government bond of nearest maturity issued in the same month. The independent variables are: *INVGRADE* is a dummy variable, which is 1 if the issue is investment-grade. LN(*AMOUNT*) is the natural log of the offered dollar amount of the issue (in $m). LN(*SYNDICATE SIZE*) is the natural log of the number of underwriters of the issue. *NEW ISSUE* is a dummy variable, which is 1 if the issue is a first-time issue. *EXCHANGE* is a dummy variable, which is 1 if the issue is listed on an exchange. *SECURED* is a dummy variable, which is 1 if the issue is secured. LN(*AGE*) is the natural log of the age of the firm in years taken from the date of incorporation. *BANK* is a dummy variable, which is 1 if the lead underwriter is a bank. *IN-HOUSE* is a dummy variable, which is 1 if the bank underwrote in-house. *AFFILIATE* is a dummy variable, which is 1 if the bank underwrote through an affiliate. All dummy variables are 0 otherwise.

	Industrial bonds						Preferred stock	
	Panel A				Panel B		Panel C	
	Noninvestment-grade		Investment-grade		In-house vs. affiliate		In-house vs. affiliate	
Variable	Coefficient	*t*-ratio	Coefficient	*t*-ratio	Coefficient	*t*-ratio	Coefficient	*t*-ratio
Constant	2.6050	23.507[a]	2.7016	11.513[a]	2.7012	27.355[a]	3.4922	31.985[a]
INVGRADE					− 0.13804	− 1.821	− 0.31003	− 2.452[b]
LN(*AMOUNT*)	− 0.21021	− 6.071[a]	− 0.18632	− 2.868[a]	− 0.20453	− 6.760[a]	− 0.17808	− 4.069[a]
LN(*SYNDICATE SIZE*)	0.15555	2.467[b]	− 0.01502	− 0.141	0.09098	1.724	0.09848	1.350
NEW ISSUE	− 0.01532	− 0.189	− 0.33154	− 1.991[c]	0.0866	− 1.186	0.00579	0.060
EXCHANGE	0.12159	1.226	0.10619	0.643	0.15044	1.809	− 0.12177	− 1.195
SECURED	0.13927	1.883	0.15999	1.062	0.12221	1.858		
LN(*AGE*)	− 0.02076	− 1.480	0.02913	0.533	− 0.01833	− 1.312	− 0.02991	− 1.400
IN-HOUSE					− 0.16664	− 2.058[c]	− 0.50115	− 3.169[a]
AFFILIATE					− 0.09036	− 1.146	− 0.29622	− 2.344[b]
BANK	− 0.13101	− 1.807	− 0.13751	− 0.927				
Observations	137		44		181		97	
	Adjusted R^2 = 0.2389		Adjusted R^2 = 0.2832		Adjusted R^2 = 0.3227		Adjusted R^2 = 0.3917	

[a,b,c]Significant at 0.01, 0.025, and 0.05 levels respectively, using a two-tailed test.

These results are also consistent with the previous results, that bank underwritings have a stronger impact for preferred stock than industrial bonds, and for new, rather than seasoned, issues. Overall, while the estimates are somewhat imprecise for the smaller subsamples, the direction of the results, the consistency of the point estimates with the priors, and the consistency of the results of each hypothesis with the others (even after controlling for other factors and the endogeneity of the bank-underwriting decision) is remarkable. Combined, these show broad support for banks having a certification role that is higher for junior and more information-sensitive securities.

4.5. In-house bank underwritings versus affiliate underwritings

The organizational form of bank participation (that is, whether the bank underwrites in-house or through an affiliate) can affect the bank's incentives. When banks make loans and underwrite securities in-house, the flow of private information from the loan department to the underwriting department is likely to be stronger and the certification effect higher. This distinction is traditionally drawn between the German and the U.K. models of banking (see, for example, Saunders and Walter, 1994, pp. 85).

The univariate tests show that, for industrial bonds, the mean yield is 23 and 13 basis points lower, respectively, for in-house and affiliate underwritings than is the mean yield for investment-house underwritings (see Table 6, panels E and F). For preferred stock, the results are similar: The mean yield is 2.85% for in-house underwritings and 3.09% for affiliate underwritings, 52 and 28 basis points lower, respectively, than the mean yield of 3.37% for investment-house underwritings. The difference between in-house and investment-house underwritings is statistically significant, but the difference between affiliate and investment-house underwritings is not statistically significant at conventional levels. This shows that in-house underwritings reduce yields, compared to investment houses, more than affiliate underwritings do. Estimates in the same direction are obtained through both the multivariate tests and selectivity tests. Table 7, which gives the multivariate tests, shows that for industrial bonds in-house underwritings reduce yield by 17 basis points for industrial bonds (significant at 5%) compared with a reduction of nine basis points by affiliate underwritings, which is statistically insignificant. The same result holds for preferred stocks: In-house underwritings reduce yield by 50 basis points as compared with a 30-basis-point yield reduction by affiliate underwritings. Similar results are obtained in selectivity-adjusted estimates (not reported in tables), which show that the information revealed by the bank underwriting in-house, reflected in the coefficient of *BKINFO*, reduces yields by nine basis points, significant at 5%. For affiliate underwritings, this coefficient reduces yields by six basis points and is insignificant. For preferred stock, the results are similar, with the *BKINFO* coefficient reducing yields by 28 basis points for in-house bank

underwritings, as compared to 17 basis points for affiliate underwritings, both coefficients significant at 1%.[9] The estimates are imprecise because of the limited subsample size, but all the test estimates are consistently in the same direction, and show that in-house underwritings do not result in higher yields (lower prices) than affiliate underwritings. Thus, banks are not perceived as having a larger conflict of interest when they underwrite in-house than when they underwrite through affiliates. If anything, the evidence shows the reverse is true.

5. Conclusion

This paper examines the pricing of securities underwritten by two types of intermediaries, banks and investment houses. The loan resources that banks have at risk give them access to private information at little cost, as compared to investment houses, which may underproduce information because of its high cost of production. Banks can convey information acquired through their loan-making activities to uninformed investors, giving rise to a certification effect. However, this certification effect must be weighed against the potential conflicts of interest that can arise when banks misuse their private information to further their self-interest. For example, a bank could systematically underwrite securities of firms to which it has bad loans outstanding, and use the proceeds from the issue to repay these loans. This study examines whether empirical evidence supports the net certification effect of the bank (after taking into account potential conflicts of interest) over investment houses, using data from a unique time interval (1/1/1927–9/30/1929) in the U.S., when commercial banks and their affiliates were legally allowed to underwrite public security issues.

In general, the results support the hypotheses outlined in Sections 1 and 4. The tests support the idea that investors perceived banks as being valuable certifiers of firm value. Hence, investors were willing to pay a higher price for bank-underwritten corporate securities (resulting in a lower *ex ante* yield). Interestingly, such a certification role was absent in foreign government bond markets, in which banks and investment houses both engaged in intense competitive bidding. Prior lending relationships were not significant in securing business, and the demand for certification services was small. In general, the evidence indicates that the net certification effect for corporate bank underwritings was higher for bonds versus preferred stock, new versus seasoned issues,

[9] An additional test of the statistical significance of the differences in the coefficients of *BKINFO* by the Wald test was conducted for hypotheses described in Sections 4.2 to 4.5. This difference is statistically significant for the comparison of industrial bonds versus preferred stock, but not for the other hypotheses. This may at least partly reflect the loss of statistical test power in the smaller subsamples, resulting in imprecise estimates. Further, the subsamples in which bank information is not presumed high are often characterized by poor fit of the regressions, for example, seasoned and investment-grade issues.

and for noninvestment-grade securities versus investment-grade securities. The results support a net certification role for banks which is more valuable for information-sensitive and junior securities.

The results question an underlying motivation of the Glass-Steagall Act, that bank underwritings had negative consequences because of potential conflicts of interest. In contrast, the evidence supports the idea that bank association with security underwritings added value to the issue. Hence, investors were willing to pay higher prices for bank-underwritten securities. This result, along with the results of lower long-term default performance of bank-underwritten corporate securities (see Ang and Richardson, 1994; Kroszner and Rajan, 1994; Puri, 1994a) confirms that investors' perception of the value of bank underwritings was *ex post* accurate in that these securities defaulted less, in the long run, than similar investment-house underwritings. There is, therefore, no evidence that investors or firms suffered from potential conflicts of interest in bank underwritings. On the contrary, firms seemed to have benefited by obtaining higher prices.

The paper contributes to the literature on the certification role of banks (which has been the subject of various papers, such as James, 1987) by examining whether the certification role was hindered when banks were allowed to underwrite and faced possible conflicting interests. The evidence shows that even under such circumstances banks had a net certification role. Further, the results support the idea that the pricing reflects the market's perception of intermediary incentives. The evidence also shows that the results are unaltered after selectivity bias adjustments were made to take the endogeneity of the bank-underwriting decision into account.

The form of bank participation in securities activities has received scant attention in academic research. The yield differential indicates that restricting the organizational form of bank participation through affiliates (the current practice in the U.S.) is unnecessary, as in-house underwritings were not subject to higher conflicts of interest that would have resulted in a 'lemons' discount. The focus in the current debate among academicians has been whether banks should be allowed to underwrite corporate securities, rather than the manner of their doing so. The question of appropriate organizational form of bank participation is an interesting area for future research, both at theoretical and empirical levels.

The evidence supports the certification effect as dominating the conflict of interest effect for banks, since the banks' net certification effect was higher than that of investment houses. Contrary to the views held by the proponents of the Glass-Steagall Act, investors did not perceive that banks misused private information at their disposal by underwriting low-quality securities. The evidence supports the opposite view, that is, investors perceived bank underwritings to be of higher quality. Thus, investors were willing to pay a higher price, which resulted in a lower *ex ante* offered yield. The direction of the differential yield for bank-underwritten corporate issues for junior versus senior securities, for new versus seasoned issues, and for noninvestment-grade versus investment-grade

securities, supports a positive role for banks as certification agents, with this role being more valuable for junior and more information-sensitive securities.

Appendix

A.1. Summary statistics

Descriptive statistics are given below for industrial bonds, preferred stock, and foreign government bonds.

A.2. Selectivity bias adjustments

A standard technique is to estimate a regression to determine influence of factors on yield as below:

$$Y_i = X_i'\beta + \gamma D_i + u_i\,, \tag{1}$$

where Y_i is the *ex ante* yield of the offered security i; X_i is the vector of factors considered significant in determining yield; and D_i is a dummy variable that is

Table 8
Summary statistics within subsamples classified by security and sector

SIZE stands for the size of the security offering in $ million. *SYNDICATE SIZE* stands for the number of underwriters in the syndicate. *AGE* stands for the age of the firm in years from the date of incorporation. *YIELD* stands for the premium of stated *ex ante* yield to maturity of security *i* over the *ex ante* yield to maturity of government bonds of nearest maturity issued in the same month.

Variable	Mean	Std. dev.	Minimum	Maximum	Cases
Panel A: *Industrial bonds*					
YIELD	2.5986	0.47857	1.260	3.700	183
SIZE	4.0814	8.1978	0.010	60.00	183
SYNDICATE SIZE	2.3224	1.8781	1.000	13.00	183
AGE	13.956	15.210	0.083	113.0	181
Panel B: *Preferred stocks*					
YIELD	3.2845	0.5316	1.510	4.330	101
SIZE	2.8375	4.6762	0.085	25.00	101
SYNDICATE SIZE	2.2277	1.7314	1.000	8.000	101
AGE	16.198	14.729	0.083	65.00	97
Panel C: *Foreign government bonds*					
YIELD	3.3307	0.8547	1.230	4.780	105
SIZE	13.546	13.370	0.500	55.00	105
SYNDICATE SIZE	4.0190	3.1039	1.000	15.00	105

1 if the bank underwrites, 0 otherwise. The bank's information h_i about the company is

$$z_i'b + \eta_i = h_i\,, \tag{2}$$

where z_i is the vector of observable factors that are significant in determining the decision of the bank to underwrite and b is the vector of coefficients of these factors. Thus, $z_i'b$ is the publicly observable part of the bank's information (h_i). η_i is the private information that the bank possesses about the firm. The bank underwrites or does not underwrite, depending on the value of h_i. Thus, the event that the bank will underwrite is denoted as B which occurs if

$$h_i \geqslant 0 \Leftrightarrow z_i'b + \eta_i \geqslant 0\,. \tag{3}$$

The event that the bank will underwrite is denoted as NB, which occurs if

$$h_i < 0 \Leftrightarrow z_i'b + \eta_i < 0\,. \tag{4}$$

The expected value of h_i conditional on the bank's choice to underwrite constitutes the information revealed to investors. Under the assumption η_i distributed $N(0, \sigma^2)$,

$$\mathrm{E}[u_i|B] = \pi\mathrm{E}[\eta_i|B] = \pi\mathrm{E}[\eta_i|z_i'b + \eta_i \geqslant 0] = \sigma\pi BKINFO_B(z_i'b|\sigma)]\,, \tag{5}$$

$$\mathrm{E}[u_i|NB] = \pi\mathrm{E}[\eta_i|NB] = \pi E[\eta_i|z_i'b + \eta_i < 0] = \sigma\pi BKINFO_{NB}(z_i'b|\sigma)]\,, \tag{6}$$

where $BKINFO_B = n(.)/N(.)$, and $BKINFO_{NB} = -n(.)/1 - N(.)$, and $n(.)$ and $N(.)$ are the standard normal density and the standard cumulative distribution function, respectively. Conditional expectations $BKINFO_B$ and $BKINFO_{NB}$ can be interpretated as the information revealed by B and NB, respectively.

Eq. (1) now becomes

$$Y_i = X_i'\beta + \mathrm{E}[u_i|B]D_i + \mathrm{E}[u_i|NB](1 - D_i) + v_i\,,$$

$$\Leftrightarrow$$

$$Y_i = X_i'\beta + wBKINFO_BD_i + (1 - D_i)\, wBKINFO_{NB} + v_i\,, \tag{7}$$

where $w = \pi\sigma$.

Eq. (7) is a complicated nonlinear function, and full information maximum likelihood can be difficult. A simple method of obtaining consistent estimates is advocated by Heckman (1979). This is a two-stage method with the

following steps:

(a) Estimate the probit likelihood function. This gives estimates of b from which I estimate $BKINFO_B$ and $BKINFO_{NB}$.
(b) Once I have $BKINFO$ estimates, Eq. (7) becomes a linear regression. w can be obtained by OLS (Ordinary Least Squares) estimation. However, the usual OLS standard errors are incorrect for two reasons:
   (i) There is an errors-in-variables problem arising from the use of an estimate of $BKINFO$ rather than its true value.
   (ii) The error term v_i is heteroskedastic.

The appropriate asymptotic covariance matrix is developed in Heckman (1979) and Greene (1981).

The heart of the test consists of testing if $w = 0$ in Eq. (7).

If $w < 0$, this indicates that the yield is actually reduced by the presence of a bank underwriting the issue, and is evidence of a certification role of banks.
If $w > 0$, this indicates that the yield is higher if a bank underwrites an issue, and is evidence of the dominance of the conflict of interest effect.
If $w = 0$, this indicates that the presence of a bank underwriting the issue has no impact on the yield, or that the two effects cancel each other out.

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