

Is the Glass-Steagall Act Justified? A Study of the U.S. Experience with Universal Banking Before 1933

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The Glass-Steagall Act of 1933 removed commercial banks from the securities underwriting business. We evaluate the argument for the separation of commercial and investment banking, that conflicts of interest induce commercial banks to fool the public into investing in securities which turn out to be of low quality. A comparison of the performance of securities underwritten by commercial and investment banks prior to the Act shows no evidence of this. Instead, the public appears to have rationally accounted for the possibility of conflicts of interest, and this appears to have constrained the banks to underwrite high-quality securities. (JEL G21, G24, N22)

The Glass-Steagall Act of 1933 prohibits commercial banks from underwriting, holding, or dealing in corporate securities, either directly or through securities affiliates.¹

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¹Technically speaking, the Act applies only to national banks and state-chartered banks that are members of the Federal Reserve System and permits limited holdings of investment-grade corporate bonds and even equity under certain conditions. For a thorough legal exposition of Glass-Steagall and its subsequent interpretation, see Jonathan Macey and Geoffrey Miller (1992 pp. 175–78, 496–97, 543–57).

The driving force behind the Act was Senator Carter Glass, who strongly believed that direct commercial-bank involvement with corporate securities was detrimental to the stability of the financial system. The commingling of investment and commercial banking functions, Glass and others argued, creates significant conflicts of interest. This view gained popular support after the Pecora Committee investigations (U.S. Senate Committee on Banking and Currency, 1933–1934) into the potentially conflict-laden and putatively abusive practices at securities affiliates of the two most prominent national banks, National City Company and Chase Securities Company.

The case of the Fox Motion Picture Company is often cited as a chilling illustration of the alleged defects of universal banking (Barrie Wigmore, 1985 pp. 171–75). The acquisition of the financially distressed Fox by General Theaters and Equipment (GTE) in 1929 was financed in part with a \$15 million loan from Chase National Bank. In early 1930, Chase Securities Company underwrote \$23 million of common stock and \$30 million of debentures for GTE, which used part of the proceeds to repay the bank loan from Chase. GTE was in financial distress the following year and turned to Chase for further assistance. At that time, Chase Securities held both equity and debt in GTE, and it decided to underwrite another \$30

million in debentures. Two years later GTE was bankrupt. Wigmore (1985 p. 175) argues that the Pecora Committee investigations show that the conflict of interests at Chase caused it to underwrite "poor securities to pay off its own loans, [and] information was concealed or misrepresented" about the quality of securities Chase was attempting to sell.²

A second issue of concern to the framers of Glass-Steagall was whether direct involvement of commercial banks in the securities business increases the riskiness of banks and the financial system. Our empirical study focuses primarily on the conflict-of-interest argument, not because risk is unimportant, but because earlier work by Eugene White (1986) already addresses the risk issue.³ With this exception, however, we have been unable to find any work since World War II which systematically analyzes the union of commercial and investment banking functions in the United States before Glass-Steagall.⁴

²Since Chase ended up owning most of the issues (because it could not convince the public to purchase them) and taking losses of over \$70 million, the Fox "escapade" could be interpreted as an example of bad business judgment rather than an "abuse" (see also George J. Benston, 1990 pp. 96, 103). Benston's (1990) recent book examines many of the specific cases from the Pecora hearings cited as examples of abusive practices and argues that few stand up to close scrutiny.

³White (1986) finds that securities operations of commercial banks did not impair their stability prior to Glass-Steagall. Banks engaged in the securities business had no higher earning variance or lower capital ratios than banks without such operations. In addition, those banks with securities operations were less likely to fail. Although 5,000 banks failed during the 1920's, virtually none were the city banks, which were the most likely to have securities affiliates (Vincent P. Carosso, 1970 p. 242; see also White, 1983). In the bank crises between 1930 and 1933, more than a quarter of all national banks failed, but less than 10 percent of those with large securities operations closed (White, 1986 p. 40). Since banks with securities affiliates tended to be larger than average-size banks and larger banks failed less often than smaller ones, this evidence must be interpreted cautiously.

⁴We have been able to discover only two early works. Terris Moore (1934) and George W. Edwards (1942), which attempt to examine systematically the relative performance of the securities underwritten by the two types of houses. These studies suffer from serious sample-selection problems and do not benefit

Again today, the appropriate degree of separation between commercial and investment banking is being debated in Washington.⁵ As in the 1920's, corporations are increasingly bypassing commercial banks and approaching the financial markets directly. Faced with disintermediation, commercial banks have lobbied regulators to expand the spectrum of permissible financial activities, and regulators have responded by eroding the barriers separating the functions. Theoretical research is ambiguous about the merit of such changes. Rajan (1992), for example, finds a trade-off between the informational economies banks realize by combining lending and underwriting and the inefficiencies resulting from a bank's inability to certify issue quality to the market when the bank is suspected of harboring conflicts of interest. Our data should shed some light on this trade-off and the merits of arguments for Glass-Steagall reform.

We start with a brief history of the movement of commercial banks into the securities business in the 1920's. We then evaluate the traditional conflict-of-interest argument that bank securities affiliates could—and did—systematically fool the (naive) public investor. We do so by examining how securities underwritten by commercial-bank securities affiliates fared in comparison to *ex ante* similar securities underwritten by independent investment banks. Section II details our first battery of tests. We find no evidence that commercial banks systematically fooled the public securities markets. Instead, there is some evidence that the markets may have rationally

from a modern understanding of financial economics. After completing this paper, we became aware of the work of James S. Ang and Terry Richardson (1993), which compares the activities of the two types of houses.

⁵The conflict-of-interest issue has been central in the recent Congressional debates on financial regulation reform: "The idea behind the compromise [legislation, offered by Representative John Dingell and supported by both the securities and banking industries, is that special SEC]...filings would be required when banks lend money to a corporate client and underwrite that client's securities within the same three-month period" (*New York Times*, 26 September 1991, p. C9).

discounted for potential conflicts among the bank affiliates. In Section III, we describe how the underwriting activities of the bank securities affiliates would compare with the activities of investment banks if, indeed, the market discounted certain types of affiliate issues. Our evidence on affiliate activities is consistent with the markets and the affiliates adapting to the potential for conflicts. In Section IV, we discuss the implications of the results for the importance of informational scope economies between lending and underwriting and consider alternative interpretations of the evidence. Section V concludes with policy implications and suggestions for future research.

I. The Movement of Commercial Banks into the Securities Business During the 1920's

According to W. Nelson Peach (1941), the government issues of Liberty bonds during World War I awakened public interest in securities markets. During the sustained economic growth of the 1920's, many firms approached the capital markets for the first time, and the capital markets grew rapidly (see Carosso, 1970). With the growth of the equity and bond markets during this period, commercial banks began to lose some of their traditional lending business to the public markets. The banks' concerns about "disintermediation" in the 1920's parallel those heard in the 1970's and 1980's. Assessing the transformation of commercial banks in the 1920's into "financial emporiums," White (1984 p. 102) concludes, "...banks' new financial services were not begun as part of a speculative lark...[but] represented a move by these firms to offset the decline of their traditional business..."

While state-chartered institutions in many states could engage in a variety of financial services without organizing affiliates, national banks had to overcome more legal hurdles to diversify their product offerings (Peach, 1941 pp. 44-51). The National Banking Act of 1864 did not permit banks to handle common stocks. Many banks had active bond departments, but court decisions in the late 19th and early 20th cen-

turies cast doubt on the legal status of these operations (see White, 1984).⁶

To avoid such impediments, national banks and some trusts incorporated affiliates under state corporate charters. These affiliates "...carried on types of business which were either expressly prohibited by statute or which the courts had declared to be *ultra vires*..." (Peach, 1941 p. 51). The Union Trust Company of Detroit, for example, incorporated an affiliate named the Union Commerce Investment Company under a Delaware charter. The Delaware charter permitted the company to do almost anything "except solemnize marriages and hold religious ceremonies" (U.S. Senate, 1934 p. 4776). There were no minimum capital regulations, and some affiliates were quite small (see e.g., Peach, 1941 p. 81). Many affiliates operated from the same premises as the parent bank. Since they generally shared the same name, affiliates enjoyed the "full benefit of the goodwill of their parent banks" (Peach, 1941 p. 52).

The 1920's saw a dramatic increase in the extent of bank and trust involvement in nonbank activities, either directly or through affiliates. As Table 1 shows, the number of national banks operating securities affiliates rose from 10 in 1922 to a peak of 114 in 1931. The number of banks engaged in the securities business through their bond departments doubled from 62 to 123 during this period. Table 2 compares relative market shares and underwriting activities of commercial bank affiliates and investment banks for the decade of the 1920's. The table, however, does not reveal the rapid growth of bond originations by bank securities affiliates during the period: the affiliates' market share of bond originations more than tripled between the middle and late 1920's (U.S. Senate, 1931 p. 299). Table 3 describes the initial "quality" of issues in each year as defined by the initial rating

⁶In 1927, the McFadden Act, best known for its effective prohibition of interstate branching, explicitly permitted national banks to buy and sell debt instruments directly through their bond departments.

TABLE 1—NUMBER OF NATIONAL BANKS, STATE BANKS, AND AFFILIATES OF NATIONAL AND STATE BANKS ENGAGED IN THE SECURITIES BUSINESS, 1922–1933

Year	National banks		State banks		Total
	Directly engaged in securities business	Operating security affiliates	Directly engaged in securities business	Operating security affiliates	
1922	62	10	197	8	277
1923	78	17	210	9	314
1924	97	26	236	13	372
1925	112	33	254	14	413
1926	128	45	274	17	464
1927	121	60	290	22	493
1928	150	69	310	32	561
1929	151	84	308	48	591
1930	126	105	260	75	566
1931	123	114	230	58	525
1932	109	104	209	53	475
1933	102	76	169	32	379

Source: Peach (1941 p. 83).

TABLE 2—NUMBER AND DOLLAR VOLUME OF U.S. INDUSTRIAL SECURITIES ISSUED DURING THE FIRST QUARTERS OF 1921–1929, BY TYPE OF SECURITY AND BY TYPE OF UNDERWRITER

Type of security	Affiliates		Investment banks	
	Number of issues	Dollar volume (millions)	Number of issues	Dollar volume (millions)
Bonds	133 (28.8) [81.6]	\$798.6 (44.4) [70.8]	329 (71.2) [48.2]	\$999.7 (55.6) [60.6]
Preferred stock	19 (9.6) [11.7]	\$181.1 (36.4) [16.1]	179 (90.4) [26.3]	\$316.9 (63.6) [19.2]
Common stock	11 (5.9) [6.8]	\$147.6 (30.7) [13.1]	174 (94.1) [25.5]	\$332.7 (69.3) [20.2]
Total for all securities	163 (19.3) [100]	\$1,127.3 (40.6) [100]	682 (80.7) [100]	\$1,649.3 (59.4) [100]

Notes: Numbers in parentheses give percentages of market share; numbers in brackets are percentages of house activities.

Source: Compiled from the monthly "New Capital Flotations" section of the *Commercial and Financial Chronicle*.

TABLE 3—INITIAL RATING OF ALL INDUSTRIAL BONDS ISSUED DURING THE FIRST QUARTERS OF 1921–1929, ANNUALLY BY TYPE OF UNDERWRITER

Year	Number (percentage)					
	Affiliate-underwritten bonds			Investment-bank-underwritten bonds		
	Investment grade	Rated below investment grade	Unrated	Investment grade	Rated below investment grade	Unrated
1921	10 (83.3)	0 (0.0)	2 (16.7)	22 (71.0)	5 (16.1)	4 (12.9)
1922	8 (57.1)	5 (35.7)	1 (7.1)	25 (55.6)	10 (22.2)	10 (22.2)
1923	17 (70.8)	3 (12.5)	4 (16.7)	29 (69.1)	11 (26.2)	2 (4.8)
1924	4 (40.0)	3 (30.0)	3 (30.0)	15 (50.0)	8 (26.7)	7 (23.3)
1925	5 (45.5)	1 (9.1)	5 (45.5)	18 (42.9)	7 (16.7)	17 (40.5)
1926	6 (33.3)	3 (16.7)	9 (50.0)	10 (30.3)	11 (33.3)	12 (36.4)
1927	12 (60.0)	2 (10.0)	6 (30.0)	14 (38.9)	14 (38.9)	8 (22.2)
1928	7 (46.7)	3 (20.0)	5 (33.3)	13 (33.3)	12 (30.8)	14 (35.9)
1929	4 (44.4)	3 (33.3)	2 (22.2)	10 (32.3)	14 (45.2)	7 (22.6)
Total:	73 (54.9)	25 (18.8)	35 (26.3)	156 (47.4)	92 (28.0)	81 (24.6)

Notes: Bonds which have a Moody's rating of Baa and above or a Poor's rating of B** and above are classified investment grade. Bonds which have a Moody's rating of Ba and below or a Poor's rating of B* and below are classified as being rated below investment grade.

Sources: Compiled from the monthly "New Capital Flotations" section of the *Commercial and Financial Chronicle*, *Moody's*, and *Poor's*.

category.⁷ For both types of houses, average bond quality fell from the early to the late 1920's, but overall the affiliates originated higher-"quality" bonds, an interesting fact that we return to later.

The Glass-Steagall Act of 1933 put an end to the trend toward "universal" banking by prohibiting the involvement of commercial banks in the securities business. The 1921–1933 period affords a fertile research area because independent investment banks and commercial banks could compete on a relatively level playing field. Entry (and exit) in the financial sector was common and much less regulated by governmental bodies than it is today. In our study, we compare the activities of commercial banks, trusts, and their affiliates (we will use the term "affiliates" to describe all three) with those of specialized investment banking houses while they were engaged in direct competition in a dynamically evolving market. We now turn to our first set of tests, which concern the relative performance of the se-

curities underwritten by the affiliates and independent investment banks.

II. Did Commercial Bank Affiliates Systematically Fool the Public?

A. Conflicts of Interest and the Relative Performance of Securities Underwritten by Affiliates

Conflicts of interest may arise when a bank combines lending and deposit-taking with underwriting. If a firm has an adverse shock without the public realizing it, for example, a commercial bank may have an incentive to underwrite public issues on behalf of the firm and use the proceeds to repay earlier bank loans made to the firm. It has also been argued that, unlike an investment bank, a commercial bank has easy access to a large number of unsophisticated depositors.⁸ Conflicts of interest thus may

⁷The categories were based on initial ratings by Moody's or Poor's, and consisted of issues rated investment grade (Baa and above), rated below investment grade (Baa and below), and unrated by either Moody's or Poor's.

⁸During congressional debate on financial regulation in 1932, Senator Robert Bulkley stated: "The banker ought to be regarded as the financial confidant and mentor of his depositors. ... Obviously, the banker who has nothing to sell to his depositors is much better qualified to advise disinterestedly and to regard diligently the safety of depositors than the banker who

give banks both the incentive and the ability to defraud naive public investors by misrepresenting the quality of issue they underwrite.

If, as alleged in the Pecora committee hearings, commercial banks succeeded in systematically fooling naive investors into investing in low-quality securities, the securities underwritten by the affiliates would have performed “poorly.” Securities underwritten by affiliates would have underperformed, on average, *ex ante* similar securities underwritten by the investment banks. Also, since information asymmetries between insiders (the underwriter and the firm’s management) and the outside public may be largest for the low-quality and lesser-known firms, the potential for taking advantage of “naive” investors would be greatest for such firms. The “naive-investor” hypothesis thus implies that the inferior performance of the bank-affiliate-underwritten issues would have been most pronounced for low-quality issues about which there is little public information.

B. Data Collection and Sources

First, we identify commercial banks engaged in investment banking prior to Glass-Steagall. The *National Securities Dealers of North America* (February 1929) contains an extensive list of firms involved in investment banking activities and notes the firms’ affiliations. Since this listing of affiliations is not complete, we also look for underwriters with some form of the words “national,” “bank,” or “trust” in their names. We then determine from *Moody’s Banking Manual* whether they have a bank charter. Finally, we include firms identified as securities affiliates in other sources: Carosso (1970), Peach (1941), H. H. Preston and A. R. Findlay (1930a, b), White (1986), and the *Commercial and Financial Chronicle*. Our search resulted in a list of just over

160 commercial banks or trusts engaged in investment banking, although only 64 of these are lead underwriters or syndicate managers in our sample.⁹

Our data on security issues are constructed from the monthly “New Capital Flotations” section of the *Commercial and Financial Chronicle* (CFC). The CFC provides a comprehensive listing of all new security issues for each month. It groups the individual issues by type of security (e.g., long bonds, short bonds, equity) and by sector (e.g., railroads, public utilities, governments), and each entry contains information on issue size, the coupon or price, the implied yield to maturity, and the underwriter(s). The lead underwriter or syndicate manager is listed first, if more than one firm is involved. Each issue for which a commercial bank, trust, or their securities affiliate is the lead underwriter or syndicate manager is included as an “affiliate-underwritten issue” in our sample. Rather than attempting to collect information on every issue during the decade of the 1920’s, we limit our sample to issues in the first quarters of the years 1921–1929.¹⁰

Next, we construct our measure of bond quality. *Moody’s Manuals* and *Poor’s Manuals* provide annual ratings for many securities. The descriptions of the ratings given by Moody’s and Poor’s suggest three broad quality categories: investment grade (Baa and above), rated below investment grade (Ba and below), and unrated by either

⁹Some of the houses we classify as investment banks, such as J. P. Morgan and Brown Brothers Harriman, did perform deposit-taking and lending services for large clients even though they did not organize themselves as commercial banks in the 1920’s. Both J. P. Morgan and Brown Brothers Harriman, however, chose to adopt commercial bank charters after the Glass-Steagall Act (see Carosso, 1970 pp. 372–74; Ron Chernow, 1991). Former partners of each organization broke away to form independent investment banks after 1933. Since the securities originated by these houses performed exceptionally well over the period, classifying such firms as bank affiliates would only strengthen our results.

¹⁰We did not find any evidence of a seasonal pattern in securities issuance which would render the first quarter unrepresentative of the whole year.

uses the list of depositors in his savings department to distribute circulars concerning the advantages of this, that or the other investment” (*Congressional Record*, 10 May 1932, p. 9912).

Moody's or Poor's.¹¹ The unrated category, with some exceptions, consists of small relatively unknown companies.

Finally, we construct measures of bond performance. Unfortunately, consistent and reliable price data are available for very few issues.¹² The only widely reported and consistent measure of performance we could find was the status of the bond—whether it was performing, called, retired at maturity, or in default.¹³ We gather these data on all bonds in our sample until 1940 from *Moody's*, *Poor's*, *Fitch's Bond Book*, *The National Monthly Corporation Bond Summary*, and the *Fisher Manual of Valuable and Worthless Securities*.¹⁴

C. The Matched-Security Method

We first perform a *matched-security test*: we match the bonds originated by bank affiliates in the first quarters of 1921–1929 with bonds issued by investment banks and compare their subsequent performance. Our focus is on bonds with maturities of at least five years (“long bonds” in the CFC) issued by industrial corporations during 1921–1929. We employ a number of criteria to find as close a match as possible to each commercial-bank-affiliate-originated issue. The following are the necessary conditions used to select a match from the issues originated by the investment banks. The issue must:

1. have the same initial Moody's or Poor's rating,

¹¹If Moody's omits a rating due to “little public interest” or “insufficient information” we turn to Poor's.

¹²The larger and higher-rated issues tend to have more price data available, but many of the smaller issues appear to have been infrequently traded. As we will discuss, information on what bondholders received after a company defaults is scant, so it is difficult to construct a consistent measure of returns.

¹³We consider a bond to be in default if it defaults on interest or principal payments. Following Arthur S. Dewing (1953 pp. 1175–82), voluntary extensions of a bond involving no interest or principle reduction are not considered defaults.

¹⁴In earlier versions of the paper, we used rating changes over time as a performance measure, but this metric adds little to a default analysis.

2. be in the same cohort (defined as being issued within plus or minus six months),
3. be of roughly the same maturity and have similar repayment provisions (e.g., serial bonds and sinking fund bonds),¹⁵
4. be within roughly the same size category (e.g., over \$5 million,¹⁶ between \$1 million and \$5 million, and under \$1 million),
5. be an industrial bond (so railroad, public utility, and foreign-government bonds are excluded),¹⁷
6. have the same conversion provision (e.g., convertible into preferred or common, although few bonds in the sample had such provisions).

If the issue is unrated by Moody's and Poor's, then necessary condition 1 is replaced by:

- 1a. be unrated by Moody's and Poor's and
- 1b. have an initial yield within 50 basis points, plus or minus, of the initial yield on the affiliate-underwritten bond.¹⁸

¹⁵The most common maturity is ten years, and most bonds have some sinking fund or serial repayment provision.

¹⁶Due to the small number of large issues, the “over \$5 million” category sometimes involves matches of very different sizes.

¹⁷We exclude these classes of issues from the present study for a number of reasons. The Reconstruction Finance Corporation made significant loans to the railroad industry and was accused of “playing favorites” in bailing out specific investment houses which had large stakes in railroads (James Olson, 1977). Dramatic changes in the regulation (and in some cases ownership) of public utilities, on both the local and federal levels, took place during the 1930's, following the collapse of the Insull empire. Although foreign-government bonds received much attention in the Pecora hearings, they pose particular problems for our method. Except for four countries which had relatively few issues outstanding, all others defaulted on either all or none of their bonds (see Ilse Mintz, 1951; Barry Eichengreen and Richard Portes, 1989). Matching across countries would make performance measures extremely sensitive to the choice of country for an otherwise comparable issue.

¹⁸Even though 50 basis points was the largest difference allowed, most of the bonds were much closer in yields. The mean yield of 6.15 for the 34 matched unrated affiliate-issued bonds is exactly equal to the mean yield of the corresponding investment-bank bonds.

In many cases, a number of bonds fit the necessary conditions for matching the affiliate-underwritten bond. In these cases, attempts were made to tighten the criteria to improve the match. Whenever possible, for example, we tried to match the collateralization status (e.g., first mortgages with first mortgages).¹⁹ In addition, we chose the bond closest in issue date to the affiliate-underwritten bond if all of the other criteria were satisfied. Our matching procedure thus attempts to control for economy-wide factors both at time of issue and over the life of the bond, the yield curve, firm or project size, sector-specific shocks, and *ex ante* quality differences as perceived by the market.²⁰ We matched 121 corporate industrial bonds originated by the commercial banks and their affiliates in the first quarters of 1921–1929.²¹

D. Results of the Matched-Security Test

For the sample of 121 matched pairs of industrial bonds, Table 4 shows that, at the end of every year after 1924, there are fewer

¹⁹Since the vast majority of industrial bonds issued in the 1920's were secured, we were able to match the collateralization status in most of the sample.

²⁰By using rating as a matching criterion, we are assuming that the Moody's and Poor's rating is an accurate proxy for public information about the security. To check this assumption, we regressed the initial yield reported in the CFC (which is an alternative summary measure of *ex ante* public information) for all the bonds in the first quarters of 1921–1929 against indicators for bond ratings and indicators for years to adjust for changes in interest rates over time. Compared to a Ba-rated bond, a Baa-rated bond yields 0.28 less, an A-rated bond yields 0.7 less, an Aa-rated bond yields 1.2 less, and an Aaa-rated bond yields 1.64 less. Each of the coefficients is highly significant. In addition, we examined the yields on the rated bonds in the matched sample and found no statistical difference in mean or median yields between affiliates and investment banks.

²¹We identified a total of 133 affiliate-underwritten industrial bond issues in the first quarters of 1921–1929. We have only 121 matched bond pairs because a dozen of the affiliate-underwritten bonds issues could not be matched using our necessary conditions (typically due to an unusual combination of size and rating) and are excluded from the matched sample. Only one of these affiliate-underwritten bonds subsequently defaulted (see footnote 28 for more details).

cumulative defaults among affiliate-originated issues. The majority of the defaults occur between the beginning of 1931 and the end of 1934: 20 (or 71 percent of) affiliate-underwritten defaults and 27 (or 69 percent of) investment-bank-underwritten defaults occur during these four years. By the end of our sample period in 1940, 39 (or 32 percent) of the investment-bank issues default, whereas only 28 (or 23 percent of) the affiliate-underwritten issues default. Investment-bank-underwritten issues thus experience roughly 40-percent more defaults than do affiliate-underwritten issues.

When we compare default performance not by number of issues, but by dollar volume of the issues, the relative performance difference is even more pronounced.²² (Given the size differences that can occur in matching issues larger than \$5 million, however, the frequency data in Table 4 are perhaps a more appropriate performance measure for our method.) In terms of dollar volumes, approximately 28 percent (\$127 million) of investment-bank-underwritten issues default by 1940 but only 11 percent (\$79 million) of affiliate-underwritten issues do. Comparing these dollar volume results with the results in Table 4, we see that the defaults were primarily among the smaller issues.²³

We also examine how the bonds performed in each year of the life of the bonds.²⁴ This method of tabulating adjusts

²²A table detailing this comparison is available from the authors upon request.

²³Because the largest affiliate-underwritten issues are much bigger than the largest investment-bank-underwritten issues, the volume figures must be interpreted with caution. To check that this does not drive the differences in default rates, we compared the 22 largest affiliate and investment-bank issues, where most of the size discrepancy exists. Both have four defaults by the end of 1940. The difference is in the 99 smallest issues where there are 24 and 35 defaults, respectively. There is no statistical difference in means or medians between affiliate and investment-bank issue sizes in this subsample of 99. (We chose a breakpoint of 99 rather than 100 simply because there were multiple issues of the same size as the 100th issue.)

²⁴An "aging" analysis table is available from the authors upon request.

TABLE 4—PERFORMANCE OF MATCHED SAMPLE OF 121 PAIRS OF INDUSTRIAL BONDS
ISSUED DURING 1921–1929, BY TYPE OF UNDERWRITER, 1921–1940

Year	Number (percentage)					
	Affiliate-underwritten bonds			Investment-bank-underwritten bonds		
	Retired	Outstanding	Default	Retired	Outstanding	Default
1921	0 (0.0)	8 (100.0)	0 (0.0)	0 (0.0)	9 (100.0)	0 (0.0)
1922	0 (0.0)	20 (95.2)	1 (4.7)	0 (0.0)	25 (100.0)	0 (0.0)
1923	2 (4.6)	41 (93.2)	1 (2.3)	1 (2.2)	45 (97.8)	0 (0.0)
1924	4 (7.6)	47 (88.7)	2 (3.8)	2 (3.7)	51 (94.4)	1 (1.9)
1925	6 (9.4)	56 (87.5)	2 (3.1)	6 (9.1)	58 (87.9)	2 (3.0)
1926	8 (9.9)	71 (87.7)	2 (2.5)	10 (11.4)	74 (84.1)	4 (4.6)
1927	13 (13.0)	84 (84.0)	3 (3.0)	13 (12.6)	84 (81.6)	6 (5.8)
1928	24 (21.4)	84 (75.0)	4 (3.6)	23 (19.7)	87 (74.4)	7 (6.0)
1929	32 (26.5)	84 (69.4)	5 (4.1)	29 (24.0)	85 (70.3)	7 (5.8)
1930	40 (33.1)	76 (62.8)	5 (4.1)	30 (24.8)	80 (66.1)	11 (9.1)
1931	42 (34.7)	71 (58.7)	8 (6.6)	32 (26.5)	69 (57.0)	20 (16.5)
1932	43 (35.5)	60 (49.6)	18 (14.9)	37 (30.6)	56 (46.3)	28 (23.1)
1933	45 (37.2)	55 (45.5)	21 (17.4)	38 (31.4)	49 (40.5)	34 (28.1)
1934	51 (42.1)	45 (37.2)	25 (20.7)	44 (36.4)	39 (32.2)	38 (31.4)
1935	59 (48.8)	36 (29.8)	26 (21.5)	56 (46.3)	27 (22.3)	38 (31.4)
1936	71 (58.7)	23 (19.0)	27 (22.3)	66 (54.6)	16 (13.2)	39 (32.2)
1937	77 (63.6)	16 (13.2)	28 (23.1)	72 (59.5)	10 (8.3)	39 (32.2)
1938	79 (65.3)	14 (11.6)	28 (23.1)	75 (62.0)	7 (5.8)	39 (32.2)
1939	81 (66.9)	12 (9.9)	28 (23.1)	78 (64.5)	4 (3.3)	39 (32.2)
1940	81 (66.9)	12 (9.9)	28 (23.1)	79 (65.3)	3 (2.5)	39 (32.2)

Notes: A bond is "retired" if the issue has been repaid in full at maturity or called before maturity; a bond is in "default" if the issue has missed a payment of principal or interest.

Sources: Moody's, Poor's, Fitch's Bond Book, Commercial and Financial Chronicle, and National Monthly Corporation Bond Summary.

for the age of bonds (see Paul Asquith et al., 1989). The investment-bank-underwritten issues default earlier in their lives than affiliate-underwritten issues. By the end of the seventh year of issue, for example, 30 of the 39 (77 percent) investment-bank issues have defaulted, but only 15 of the 28 (53 percent) affiliate issues have.

To examine the relative performance of the matched issues taking into account both the number of defaults and the timing of the defaults, we perform a log-rank test (see J. Kalbfleisch and R. Prentice, 1980). This test compares the survival curves (or mortality rates) of the two groups of bonds. We define the life of a defaulted bond as the period from issue date to the date of default. A retired issue is treated the same way as a bond that is outstanding at the end of our observation period; thus, it is assumed to have survived until the end of

1940.²⁵ For the whole matched sample, the first row of Table 5 reports that the survival rate of affiliate-underwritten bonds is higher than the investment-bank-underwritten issues at the 10-percent significance level.

To investigate the importance of initial bond quality and time trends, we split the sample and rerun the log-rank test. If the matched sample of bonds is subdivided into bonds rated investment grade at issue and those which are non-investment grade (including both the unrated bonds and those rated below investment grade), we find a statistically significant difference at

²⁵The rationale is that investors could have bought securities with the repaid principal and been as well off as if the bonds had never been retired. Of course, this assumes that the cost of accepting potentially lower reinvestment rates is small.

TABLE 5—RESULTS OF THE LOG RANK SURVIVAL ANALYSIS FOR THE MATCHED SAMPLE OF 121 PAIRS OF INDUSTRIAL BONDS ISSUED DURING 1921–1929

Sample	Affiliates		Investment banks		X^2 [<i>p</i> value]
	Actual defaults	Predicted defaults	Actual defaults	Predicted defaults	
All bonds (<i>n</i> = 242)	28	34.72	39	32.28	2.70 [0.100]
Non-investment grade (<i>n</i> = 110)	12	18.97	23	16.03	5.59 [0.018]
Investment grade (<i>n</i> = 132)	16	16.72	16	16.28	0.01 [0.92]
Issued 1923–1929 (<i>n</i> = 196)	22	29.56	35	27.44	4.02 [0.045]
Issued 1921–1922 (<i>n</i> = 46)	6	4.77	4	5.23	0.61 [0.435]

Notes: Subsamples are formed by initial rating and by year of issue. The log-rank test (chi-square) compares the number of defaults and the predicted number if the defaults were distributed equally across the two types of underwriters over time.

the 5-percent level for non-investment-grade bonds but not for bonds rated investment grade. The bank affiliates thus appear to do particularly well for the lower-rated and unrated issues.²⁶ In addition, to check for time effects, we split the sample into those bonds issued in the early phase of bank entry into underwriting (1921–1922), which includes a sharp macroeconomic contraction, and those issued in the later phase (1923–1929). Affiliate-underwritten issues in the later phase have a better survival rate (statistically significant at the 5-percent level), but there is no statistical difference in survival for the small sample of bonds issued in the early phase.

Although consistent data on the payments to bondholders when a firm defaults are difficult to obtain, we examined the defaults in this sample more closely to determine the returns to bondholders. Table 6 contains the results for the subsample of defaults on which we could obtain informa-

tion. First, on average, bondholders of investment-bank-underwritten issues obtained cash or securities worth roughly half of face value when the default was resolved.²⁷ Bondholders of affiliate-underwritten issues obtained about 40 percent of face value, but the difference is not statistically significant. Second, affiliate defaults appear to have been resolved somewhat quicker with a mean time of resolution of 2.4 years compared to a mean time of 2.8 years for investment banks, but again the difference is not statistically significant. Third, affiliate-underwritten defaults have disproportionately fewer liquidations and more security exchanges. Since we do not have data on all of the default resolutions, we must be cautious in drawing strong conclusions from Table 6.

To summarize, the results from the matched-sample test show that affiliate-underwritten issues defaulted statistically significantly less often than *ex ante* similar

²⁶ Within the category of initially non-investment-grade bonds, we have the following performances: for the bonds rated below investment grade, three affiliate bonds versus six investment-bank bonds default; for the unrated bonds, nine affiliate bonds versus 17 investment-bank bonds default.

²⁷ This is defined as the value of the old bond or the package of securities obtained in exchange when the court finally approves the settlement or reorganization plan. In some cases, the securities prices used for valuing the resolution were prices more than one year after the approval date.

TABLE 6—RESOLUTION OF DEFAULT FOR THE DEFAULTING BONDS IN THE MATCHED SAMPLE OF 121 PAIRS OF INDUSTRIAL BONDS ISSUED DURING 1921–1929, BY TYPE OF UNDERWRITER

Underwriter	Variable	How the default was resolved				Average for the samples
		Bondholders paid in full	Bond exchanged for new bond ^a	Bond exchanged for bond with lower face value or earnings-contingent securities ^b	Firm liquidated and bondholders paid partially ^c	
Affiliates	number of defaults resolved	3	11	8	5	—
	(percentage of defaults)	(11.1)	(40.7)	(29.6)	(18.5)	
	value received on resolution ^d	100	43.6	18.4	39.6	41.1
	years from default to resolution ^e	2	2	4.3	0.8	2.4
Investment banks	number of defaults resolved	3	8	11	13	—
	(percentage of defaults)	(8.5)	(22.9)	(31.4)	(37.1)	
	value received on resolution ^d	100	55.8	34.9	49.6	50.8
	years from default to resolution ^e	3	2.5	3.6	2.1	2.8

Note: Information on resolution is available for only 35 of the 39 investment-bank defaults and 27 of the 28 affiliate defaults.

Sources: Moody's, Poor's, Fitch's Bond Book, Commercial and Financial Chronicle, National Monthly Corporation Bond Summary, National Monthly Stock Summary, and Fisher Manual of Valuable and Worthless Securities.

^aThis requires that there be no impairment to the amount of the principal or its security.

^bThe bond was generally replaced by a bond with the same security but lower face value. In some cases, securities junior to the original bond (e.g., debentures [only for secured bonds], income bonds [which have interest payments contingent upon current earnings], preferred stock or common stock) were offered in compensation.

^cThe firm was liquidated, and bondholders received less than the full value of principal and interest.

^dThe value is expressed as a percentage of face value. This value is calculated either from (i) a market price for the old bond immediately after the resolution was approved by the courts or (ii) the price of the securities offered in exchange as close after the resolution as possible. The values are available for only 32 of the 39 investment bank defaults and 24 of the 28 affiliate defaults.

^eThe time from the date of default to the date that the court gives final approval to the resolution plan.

investment-bank-underwritten issues.²⁸ The differences in default rates are greatest for the non-investment-grade issues. Clearly, this refutes the naive-investor hypothesis, which would suggest significantly higher de-

fault rates among affiliate-originated bonds, especially for low-quality issues. Affiliates do not seem to have systematically fooled the public.²⁹ Before developing further hy-

²⁸ Recall that there were 12 issues we could not match (see footnote 21). Of these, seven were rated investment grade. These could not be matched because of their high rating and size (e.g., a \$50 million issue by Anaconda Copper and a \$20 million issue by Standard Oil of New Jersey). The remaining five issues are under \$1 million and rated below investment grade. Of the 12, only one \$900,000 issue defaulted (and we could not find performance information on one \$500,000 issue). Thus, loosening the matching criteria to include these bonds would not change our results.

²⁹ A referee has pointed out that issuing junior claims such as equity might be attractive for an unscrupulous affiliate trying to enrich itself at the public's expense. To investigate this, we expanded the search for common stock issues by affiliates to all four quarters from 1921 to 1929 since there were so few in the first quarter (see Table 2). We found prices for 15 of the affiliate-underwritten stocks on the Center for Research in Security Prices (CRSP) tapes (which begin in December 1925) and used prices from the *Bond Quotation Record* for those issued earlier. We measure the return on these issues relative to the return on the portfolio of

TABLE 7—ESTIMATES FOR LOGIT DEFAULT PREDICTION FOR THE SAMPLE OF ALL INDUSTRIAL BONDS ISSUED DURING THE FIRST QUARTERS OF 1921–1929

Independent variable	(i)	(ii)	(iii)
Unrated indicator (1 if unrated)	0.594 (1.853)	1.006 (2.795)	1.451 (3.339)
Rated below investment grade indicator (1 if rated below investment grade)	0.250 (0.909)	0.414 (1.364)	0.297 (0.795)
Affiliate indicator (1 if affiliate)	-0.565 (-2.061)	-0.108 (-0.312)	0.343 (0.840)
(Affiliate)×(unrated) interaction	—	-1.801 (-2.340)	-2.284 (-2.404)
(Affiliate)×(rated below investment grade) interaction	—	-0.563 (-0.864)	-0.940 (-1.262)
Debt/total assets	—	—	0.916 (0.408)
X^2 for likelihood-ratio test that affiliate and interaction terms are jointly zero: [<i>p</i> -value]:	—	10.85 [0.013]	8.02 [0.046]
Number of observations:	413	413	305
X^2 for the regression: [<i>p</i> value]:	29.65 [0.013]	36.04 [0.005]	28.83 [0.036]

Notes: The dependent variable, DEFAULT, equals 1 if the bond defaults, 0 otherwise, and has mean equal to 0.28. One-digit SIC industry and year indicators are included in the regression but have been omitted from the table. The numbers in parentheses below each coefficient estimate are *t* statistics.

potheses to explain the results from the matched-sample test, we now examine their robustness.

E. Logit Default-Prediction Model

Our matching procedure may raise two concerns. First, it could involve a selection bias, and that bias may be driving the results. Second, we may be ignoring relevant data; that is, there are many investment-bank-underwritten issues brought out in the first quarters of 1921–1929 that we do not consider. While we believe that a matched-

sample approach is a robust way of analyzing situations for which no clear theory exists to guide regression specifications, we undertake a more “efficient” test of relative underwriting performance using a logit default-prediction model.

The sample for the logit includes long-term industrial bonds underwritten by both affiliates and investment banks during the first quarters of 1921–1929 (thus we add a large number of investment-bank bonds to the matched-sample [see Table 2] and discard investment-bank matches from outside the first quarter). We gathered data on the bonds and the firms from the sources we described above for the matched-sample test. The logit analysis examines whether the type of underwriter affects the likelihood of default, controlling for a variety of security and firm characteristics. It thus serves as a robustness check of the results from the matched security test. Since we do not derive the default prediction equation from an explicit model, in Table 7 we report a number of specifications. We include indicator variables for one-digit industry SIC

stocks listed on the CRSP tape in the firm’s size decile and the S&P industrial stock index. The affiliate-underwritten stocks had superior performance at each of the intervals we checked (3-, 5-, and 10-year horizons from issue, the market troughs in 1932, 1935, and 1940), although the differences are not statistically different from zero. While the sample is small, the results for common stock issues corroborate our findings for bonds.

code and the year of issue but do not report their coefficient estimates.³⁰

Column (i) in Table 7 shows that, controlling for initial rating, affiliate-underwritten issues are less likely to default than are the investment-bank-underwritten issues, and the coefficient is statistically significant at the 5-percent level. For the mean issue in our sample, the coefficient estimates imply that underwriting by an affiliate reduces the probability of default by 0.11. To gauge the magnitude of the "affiliate" effect, this probability is approximately equal to the difference in probability of default between an investment-grade bond and an unrated bond in this sample. The effect is thus economically as well as statistically significant.

To identify the impact of underwriter type on issues of different quality rating, we include interaction terms which indicate whether an affiliate underwrites a bond rated below investment grade or an unrated bond. The coefficients are reported in column (ii). The coefficient estimates for the interaction terms indicate that the unrated affiliate-underwritten bonds defaulted far less often than unrated bonds underwritten by investment banks. A similar but smaller default-performance advantage for the issues underwritten by affiliates also obtains for the bonds rated below investment grade. In specification (ii), the affiliate indicator individually is no longer statistically significant, but this may be due to its high correlation with the interaction terms. We use a likelihood-ratio test to test whether the affiliate indicator and interaction variables are jointly statistically significant, and they are at roughly the 1-percent significance level. Finally, in column (iii) we include the ratio of debt (including the new bond issue) to total assets in the year of issuance. Although we lose a quarter of the observations, the same qualitative results emerge. In summary, the results from the matched-

sample test are confirmed by the logit default prediction: affiliate-underwritten issues defaulted less frequently, and the difference in default performance is most pronounced for the lowest-quality issues. We now describe a hypothesis which might explain this finding.

III. Rational Adaptation to the Potential for Conflicts of Interest

A. An Example of Discounting for "Rogue" Banks

A rational-expectations analysis of conflicts of interest offers predictions which contrast with those of the simple naive-investor hypothesis and which are consistent with the above results. While rational investors may not possess the information the commercial-bank affiliate uses to gauge a firm's quality, they understand its motives. Investors realize that some affiliates may be less forthcoming than independent investment banks in communicating information about issue quality, due to possible conflicts of interest. They will be most wary when there is little public information about an issue, as in the case of small issues by little-known firms, which form the bulk of our unrated sample. When information asymmetry and conflicts of interest are potentially important, suspicious investors rationally "tax" the issues underwritten by affiliates by applying a "lemons-market" discount to their issues. This may account for the difference in performance between affiliate and investment-bank offerings, and the increasing difference as quality deteriorates. The following example makes the point clear.

Assume that securities which have a true quality of Caa always default and repay nothing in default; securities of true quality B default with probability 0.2 and repay half of the principal in default (and thus have an expected payout of 0.9 per dollar invested); and securities of true quality Ba do not default. Let the market (and rating agencies) have rational expectations that one in ten affiliates are "rogues" who succumb to conflicts of interest and misrepresent securities of quality Caa as being Ba. The remain-

³⁰We also tried including firm age, size of issue, indicators for collateralization, and indicators for the stated purpose of issue, but none of these variables was statistically significant. The results for the affiliate variables did not change, and thus we do not report these regressions.

ing nine banks underwrite only Ba securities. Because the true quality is the affiliates' private information and the market cannot distinguish who the rogues are, they know the expected payout from each dollar invested in the bond is $(9/10) \times 1 + (1/10) \times 0 = 0.9$. This is equivalent to the expected payout from each dollar invested in a bond which is truly B. Investors and rating agencies will then treat all Ba bonds issued by bank affiliates as B-rated, thus applying a "lemons" discount to nine out of ten affiliate-underwritten bonds. If the performance of affiliate-underwritten bonds is compared with *ex ante* similar (B-rated bonds) underwritten by investment banks, we should find *ex post* that more investment-bank-underwritten bonds default (20 percent) than do affiliate-underwritten bonds (10 percent), but pay more in default (50 percent vs. 0 percent). An identical argument can be made when bonds are matched on price (or yields) rather than ratings.³¹

The low predictive power of ratings and yields for the subsequent performance of affiliate issues (but their high predictive power for the investment-bank issues) is consistent with theories of the effect of apparent conflicts on an underwriter's ability to certify (e.g., Vincent Crawford and Joel Sobel, 1982; Rajan, 1992). For the matched sample, 16 of the 66 affiliate bonds rated investment grade default (24 percent), compared to three of the 21 bonds rated below

investment grade (14 percent), and nine of the 34 unrated issues (26 percent). The differences in default rates are not statistically significant. In contrast, the initial ratings and yields appear to be good predictors of default for the investment-bank-underwritten issues. For the matched issues underwritten by the investment banks, the default rate rises as the initial rating falls: 24 percent of the investment-grade bonds, 29 percent of the bonds rated below investment grade, and 50 percent of the unrated issues default. The difference in the default rates across the different grades of investment-bank-underwritten bonds is statistically significant at the 5-percent level. For the sample of all investment-bank-underwritten bonds issued in the first quarters of 1921–1929, the default rates are 25 percent, 34 percent, and 46 percent, respectively, and the differences are statistically significant at the 1-percent level. These results suggest that, relative to investment banks, affiliates were less able to certify quality for "information-intensive" issues to the rating agencies and the market.³² We now discuss how this rational adaptation would affect the activities of the affiliates.

B. *Implications of Rational Adaptation for the Underwriting Activities of the Affiliates*

The imposition of a "lemons" discount on certain affiliate-underwritten issues impairs the ability of bank affiliates to bring these issues to market. This is especially true for small, relatively lesser-known bank

³¹For the market to apply a lemons-market discount it is sufficient that the underwriter lack credibility as a certifier. Conflicts of interest are only one reason (though perhaps the most important one) why the affiliates may have had lower credibility than independent investment banks. Another potential reason is that many affiliates were more recent entrants than the investment banks into underwriting and therefore had not built sufficient reputations of integrity. Also, we can interpret the naive-investor hypothesis in this framework, namely, that the public market systematically underestimated the share of rogue affiliates. If the public did so, we would expect to find a higher default rate for the affiliates—which is contrary to our findings. Our results are consistent with the investing public's expectation about the market share of rogue affiliates that turned out to be either correct or a bit too pessimistic.

³²There are a number of possible reasons why firms might choose affiliates to underwrite their "information-intensive" securities despite being subject to the "discounts." First, White (1986) has documented diversification benefits for the banks combining underwriting and lending in the 1920's. Affiliates thus may have been able to charge lower underwriting fees to firms because underwriting would have helped hedge the rest of their operations. Second, affiliates may have been trying to build their credibility in this segment of the market during the 1920's, so they may have decided to invest in reputation by charging relatively low underwriting fees for these deals. Third, these firms may not have been able to convince independent investment banks to underwrite securities for them.

affiliates without much reputational or equity capital. Furthermore, the discount would tend to be larger for junior securities and information-sensitive securities issued by small, young, relatively unknown firms. Relative to independent investment banks with similar capital, we would expect small affiliates to underwrite more senior securities issued by older, larger, and less risky firms. Large affiliates of relatively well-known banks, however, have substantial reputations to offset the suspicion that they would succumb to conflicts. Their issues are less likely to be subject to discounts than the issues underwritten by small affiliates. If so, we expect less difference between the underwriting activities of large well-known affiliates and investment banks and large differences between the underwriting activities of small, little-known affiliates and investment banks. The counterpart of the public markets rationally adapting to the bank affiliates' conflicts of interest is that the affiliates themselves should adapt their underwriting activities to the market discount.³³

C. *The Matched-Underwriter Test*

The rational-adaptation hypothesis not only suggests that affiliates will differ from investment banks in their underwriting activities, but also that the difference will depend on the size of the underwriter's reputational and equity capital. There is no easy way to measure either reputational or equity capital. We will use the size of issues

³³Another way to reduce the size of the potential discount is for affiliates to co-underwrite with credible investment banks. Prior to the Securities Acts of 1933 and the Securities Exchange Act of 1934, it appears that the burden of investigating and certifying the issue fell primarily upon the lead underwriter and not the syndicate (see Moore, 1934 p. 479). It is not clear whether co-underwriters had enough influence over the lead underwriter's decisions for them to add credibility to the offering. Furthermore, the fixed costs of employing an additional underwriter (who also acquires information about the firm) are likely to be high. Multiple underwriters thus may have been a feasible way to attempt to reduce the lemons discount for large issues but not for small issues.

brought to market by the underwriter as a proxy for both aspects of capital. Our rationale is that only underwriters with large implicit (reputational) and explicit (equity) capital can provide the insurance and credibility that large issues require. We therefore use the median size of issue underwritten during the first quarter of 1921–1929 as a measure of the underwriter's capital.³⁴

We divide underwriters into three groups on this basis. Because there are far fewer affiliate issues in our sample, we pick break points that ensure approximately equal affiliate issues in each group. A natural division is into underwriters with median issue size greater than \$5 million, whom we call "large," those with median issue size less than \$1 million whom we call "small," and those in the middle who are labeled "medium." Table 8 shows that there are nine large affiliates and investment banks, who account for 46 and 61 issues, respectively, in the first quarters of 1921–1929. Thirty-five small affiliate underwriters account for 52 issues, and 177 small investment banks account for 280 issues. Thus, the large underwriters also tend to underwrite more often. We now examine the activities of these underwriters in the first quarters of 1921–1929.

D. *Results of the Matched-Underwriter Test*

Table 8 shows that the affiliates, in general, underwrite larger issues. The median issue size for all affiliate issues (not shown in the table) is \$1.75 million, while the median issue size for all investment-bank issues is \$1.005 million. The medians are different at the 1-percent level of significance. In our sample, large firms (as measured by the size of book assets), in general, make

³⁴We also tried an alternative proxy of the number of issues underwritten by a house. It results in a very similar classification of the underwriting houses and does not qualitatively alter the results. Neither measure, however, would be a good proxy for capital if some houses take on more risk by underwriting larger issues or more issues with the same amount of (unobserved) capital.

TABLE 8—COMPARISON OF THE ISSUING ACTIVITIES OF AFFILIATES AND INVESTMENT BANKS BY SIZE CLASS, FOR THE SAMPLE OF ALL INDUSTRIAL BONDS, PREFERRED STOCK, AND COMMON STOCK ISSUED IN THE FIRST QUARTERS OF 1921–1929

Underwriter	Variable	Large underwriters ^a	Medium underwriters ^b	Small underwriters ^c	All underwriters
Affiliates	number of underwriters	9	20	35	64
	number of issues	61	50	52	163
	mean size of issue (\$thousand)	15,567.86	2,863.36	663.36	6,915.93
	median firm age at issue ^d	22	17	23	21.5
Investment banks	number of underwriters	9	143	177	329
	number of issues	46	355	280	681
	mean size of issues (\$thousand)	11,496.80	2,778.69	476.98	5,055.73
	median firm age at issue ^d	11	16	14	15

Sources: *Commercial and Financial Chronicle*, *Moody's*, *Poor's*, and *Fitch's*.

^aLarge underwriter: median issue size originated during the first quarters of 1921–1929 is greater than \$5,000,000.

^bMedium underwriter: median issue size originated during the first quarters of 1921–1929 is between \$5,000,000 and \$1,000,000.

^cSmall underwriter: median issue size originated during the first quarters of 1921–1929 is below \$1,000,000.

^dFirm age is defined as the number of years between the issue date and the date the industrial firm was founded.

large issues.³⁵ The table thus suggests that affiliates tend to underwrite larger firms. The median age (defined as the years from founding to issue date) of firms brought to market by the investment banks is 15, while the median age for affiliates is 21.5. Again these differences are significant at the 1-percent level. When the sample is partitioned into the three size classes, the age difference is statistically significant for only the small-underwriters subsample.

Table 2 shows that, on average for the decade of the 1920's, affiliates underwrote fewer common-stock and preferred issues than did the investment banks. More interesting patterns arise when we look at the different underwriter subgroups. Table 9 shows little economic or statistical difference between the mix of securities underwritten by the large affiliates and the mix underwritten by large investment banks. There is, however, a significant difference

between the mix of securities underwritten by small affiliates and small investment banks. Small investment banks underwrite a greater fraction of junior securities than do the large investment banks. By contrast, small affiliates underwrite far fewer junior securities than do large affiliates.³⁶ Together, Tables 8 and 9 suggest that affiliates underwrite larger, older firms and generally concentrate more on senior securities like debt than do the investment banks. The difference between affiliates and investment banks is the greatest for the small-underwriters group.

E. Logit Analysis

We must be cautious in drawing conclusions from the unconditional correlations presented in Tables 8 and 9. If equity is issued only by younger firms, for example, the fact that investment banks underwrite equity could result in their underwriting

³⁵We have data on book assets for only a subset of the industrial firms in our sample. The correlation between book assets and size for firms for which we have the data is 0.7, so using issue size as a proxy for firm size seems reasonable.

³⁶The difference between the kinds of securities that affiliates and investment banks issue in the medium group is similar to that in the small group.

TABLE 9—COMPARISON OF THE TYPES OF SECURITIES ISSUED BY LARGE AND SMALL AFFILIATES AND INVESTMENT BANKS DURING THE FIRST QUARTERS OF 1921–1929

Underwriter	Number of issues (percentage)			
	Bonds	Preferred stock	Common stock	Total
Large underwriters: ^a				
Affiliates	42 (68.9)	11 (18.0)	8 (13.1)	61 (100.0)
Investment banks	29 (63.0)	10 (21.7)	7 (15.2)	46 (100.0)
$X^2_{[2]} = 0.4, \quad p = 0.819$				
Small underwriters: ^b				
Affiliates	44 (84.6)	7 (13.5)	1 (1.9)	52 (100.0)
Investment banks	137 (48.8)	75 (26.7)	69 (24.6)	281 (100.0)
$X^2_{[2]} = 24.4, \quad p < 0.001$				

Note: The chi-square statistic reported is the Pearson's chi-square for the hypothesis that affiliate and investment-bank rows are from the same distribution.

^aLarge underwriter: median issue size originated during the first quarters of 1921–1929 is greater than \$5,000,000 (see Table 8).

^bSmall underwriter: median issue originated during the first quarters of 1921–1929 is below \$1,000,000 (see Table 8).

younger firms. A more satisfying test of the hypotheses thus would involve conditional correlations. We obtain these by performing a logit analysis where the dependent variable is 1 if an issue is underwritten by an affiliate and 0 if underwritten by an investment bank. Another way to think about these regressions is that a firm chooses between an affiliate and an investment-bank underwriter based on its own characteristics and the kind of security it wants to issue. If the rational-adaptation hypothesis is valid, the firms know the discount that public capital markets will impose on issues underwritten by affiliates lacking credibility. By a revealed-preference argument, the coefficients on firm and issue characteristics reveal the relative competencies of the two types of underwriters. The results are in Table 10.

The coefficients in column (i) indicate that affiliates are more likely to underwrite larger, older firms and debt rather than junior securities like equity and preferred stock. The coefficient estimates for these variables are statistically and economically

significant. A standard-deviation increase in the log of issue size increases the probability of the firm choosing an affiliate by 0.05. A standard-deviation increase in the log of the firm's age increases the probability of the firm choosing an affiliate by 0.04. A stock issue has a 0.21 lower probability than a bond issue to be underwritten by an affiliate. A preferred issue has a 0.16 lower probability than a bond issue to be underwritten by an affiliate. In specification (ii), we include an indicator which is 1 if the firm is listed on an exchange, and in (iii) we include the ratio of debt to total assets for the firm. A listed firm is more likely to prefer an affiliate, while a highly leveraged (and therefore more risky firm) is less likely to prefer an affiliate. The coefficients on these two variables, however, are not measured precisely. In column (iv) we report coefficients when we interact the explanatory variables with an indicator if the underwriter is small. Except on the dimension of whether the issue is a preferred share, the difference in the activities of affiliates and investment banks is accentuated in the case

TABLE 10—ESTIMATES FOR LOGIT ANALYSIS PREDICTING WHETHER AN AFFILIATE UNDERWRITES AN ISSUE, FOR THE SAMPLE OF ALL INDUSTRIAL BONDS, PREFERRED STOCK, AND COMMON STOCK ISSUED IN THE FIRST QUARTERS OF 1921–1929

Independent variable	(i)	(ii)	(iii)	(iv) ^a
Log of issue amount (thousands)	0.286 (3.378)	0.335 (3.140)	0.315 (3.184)	0.429 (3.782)
Indicator is 1 if issue of common stock	-1.594 (-4.189)	-1.576 (-3.759)	-2.901 (-4.338)	-1.516 (-3.658)
Indicator is 1 if issue of preferred stock	-1.215 (-3.913)	-1.051 (-3.167)	-1.413 (-3.567)	-1.314 (-3.153)
Log of firm age in years	0.223 (2.385)	0.252 (2.315)	0.137 (1.275)	0.192 (1.766)
Indicator is 1 if firm is listed on an exchange		0.127 (0.443)	—	—
Ratio of debt to total assets at time of issue			-1.025 (-1.082)	—
Indicator is 1 if small underwriter ^b does the issue				0.265 (0.359)
Indicator is 1 if issue of common stock by small underwriter				-1.249 (-1.119)
Indicator is 1 if issue of preferred shares by small underwriter				0.880 (1.414)
(Log of firm age) × (indicator if small underwriter) interaction				0.090 (0.397)
Number of observations:	651	545	520	651
X^2 for the regression:	76.01	65.53	62.76	83.96
[p value]:	0.0000	0.0000	0.0000	0.0000

Notes: The dependent variable, which has a mean of 0.20, is 1 if an affiliate is the lead underwriter for the issue and 0 if the lead underwriter is an investment bank. One-digit SIC industry and year indicators are included in the regression but have been omitted from the table. Numbers in parentheses are t statistics. A small underwriter is defined as having a median issue size originated during the first quarters of 1921–1929 below \$1 million (see Table 8).

^aThe chi-square statistic for the likelihood-ratio test that the small underwriter and interaction terms are jointly zero is 7.96, which has a p value of 0.09.

of small underwriters, and the affiliate and interaction terms as a group are statistically significant at the 10-percent level.

IV. Alternative Interpretations and Further Implications of the Results

A. The Role of Bank-Borrower Relationships

An alternative explanation of our result that the affiliate-underwritten issues default less frequently is that they were subject to a (largely unanticipated) factor which did not affect the investment-bank-underwritten issues. Perhaps firms that were clients of affiliates enjoyed stronger ties to their banks and so had better access to credit during the Depression. This relationship thus may

have helped affiliate client firms avoid default.³⁷ In the 1920's, the expectation of a business-cycle downturn as prolonged and severe as the Great Depression was undoubtedly quite small. The ratings and initial yield thus (rationally) would have involved only a negligible adjustment for the "Great Depression" insurance provided by a close relationship with a commercial bank.

³⁷Between the second quarter of 1932 and the first quarter of 1935, for example, the total issuance of bond, preferred-stock, and common-stock finance dwindled to nearly zero (*Moody's Banking and Finance Manual*, 1939). The Reconstruction Finance Corporation made large loans to (and investments in) banks and other enterprises during this period (see U.S. Treasury, 1959).

If indeed banking relationships during the unanticipated Depression were valuable, affiliate-underwritten issues should outperform investment-bank-underwritten issues during the Depression years, but not before.³⁸ Although most of the performance differences occur in the 1930's, there were differences even before the onset of the Great Depression: by the end of 1929, in our matched sample seven investment-bank-underwritten bonds default compared with five defaults for the bonds underwritten by affiliates. While we should be cautious about drawing strong conclusions, because the difference is small (though the 40-percent difference in default rates is the same as that in the Depression subperiod 1930–1940) and not statistically significant, it is suggestive that unanticipated benefits from banking relationships may not be the entire explanation.

Banking relationships also could provide an alternative explanation of our result that affiliates underwrite relatively less equity than investment banks. If a banking relationship lowers the costs of financial distress, then *ceteris paribus*, firms with such a relationship may have been able to rely more heavily on debt finance than firms without it. The relative paucity of equity issues underwritten by affiliates thus may be driven by low demand from affiliate client firms rather than adverse selection. In our sample, however, the ratio of debt to total assets for affiliate client firms immediately after their bond issue is slightly lower than

for the firms that use investment banks (0.296 vs. 0.306). This evidence does not suggest that affiliate client firms have higher debt capacities. The affiliate client firms, however, do make fewer equity issues during the 1920's; for the matched sample, 22 firms using an affiliate to underwrite their debt also issued common or preferred stock, whereas 30 firms using an investment bank to underwrite their debt did so. The difference in these numbers is too small to account for the large differences in equity issuances between affiliates and investment banks discussed in the previous section.

We also compare the identity of the underwriter for the equity issues with the underwriter for the bond issues. Of the 16 firms in the matched sample that use an affiliate for their bond issue *and* issue equity through an underwriter,³⁹ 11 (69 percent) use a different underwriter for the equity issue. Of the 18 firms that use an investment bank to underwrite a bond *and* issue equity through an underwriter, only eight (44 percent) use a different underwriter for their equity issue. Firms using an affiliate for their debt issues thus switch to a new underwriter for their equity issuances more often than do investment-bank client firms.⁴⁰ Although the number of observations here is small, this evidence supports our interpretation that the affiliates appear to lack a comparative advantage in underwriting equity.

B. *Informational Scope Economies from Combining Lending and Underwriting*

A prominent argument in the current debates about Glass-Steagall repeal concerns scope economies in information access and

³⁸It is also possible to argue that a firm which depended extensively on a bank relationship may have been worse off during the (unanticipated) turmoil in the 1930's). First, the banking crises between 1930 and 1933 may have reduced the ability of banks to provide credit. Second, the Glass-Steagall Act of 1933 restricted the areas of interaction between banks and firms, thus reducing the benefit to banks of maintaining relationships and, perhaps, reducing their incentive to provide credit. This argument would suggest that banking relationships might have lowered the *ex post* relative performance of affiliate-underwritten issues.

³⁹The rest undertook rights offerings.

⁴⁰All of the affiliate client firms that switched underwriters chose an investment bank, not another affiliate, for the equity issue. In all but two cases, the investment-bank client firms switched to another investment bank.

processing.⁴¹ Since firms typically have had bank loans before they issue public securities, banks may have firm-specific information which would give them an advantage over investment banks in underwriting more “information-intensive” securities, in other words, junior securities of younger, smaller, and less well-known firms. Universal banking thus could particularly benefit small and young firms, providing them greater access to the public securities markets than they otherwise would have had.

We find, however, that commercial banks were relatively inactive in this segment of the market. We must be cautious in concluding from this evidence that the informational scope economies realized by affiliates were small relative to the cost of discounts imposed by a market concerned about conflicts. First, banks may have been more conservative due to potential reputational spillovers from their underwriting to their banking business (note that national banks had double liability and no deposit insurance prior to 1933).⁴² The significance of this factor is difficult to measure, but the fact that the largest affiliates seem immune to these spillovers is troublesome for this theory (see Tables 9 and 10). Second, affiliates may have underwritten older and larger firms simply because those were firms with which they had preexisting relationships, which formed the basis for informational scope economies. If this is the case, then the benefits to smaller and younger firms from Glass-Steagall repeal may not be large. Third, commercial banks, with their prior experience in loan analysis, may have had

more in-house expertise for evaluating debt contracts rather than equity. While this hypothesis is not directly testable, we do not find a tendency for affiliates to “learn” about equities over time, that is, the affiliates’ share of the equity issuance market declined somewhat during the 1920’s.⁴³

V. Conclusion

Our results are not consistent with the popular belief that “...bank affiliates had underwritten and sold unsound and speculative securities, [and] published deliberately misleading prospectuses...” (Melanie Fein, 1986 p. A-5). Not only did bank affiliates underwrite higher-quality issues, but also we find that the affiliate-underwritten issues performed better than comparable issues underwritten by independent investment banks. The superior affiliate performance is most pronounced among the lower-rated and more “information-intensive” issues.

Our study indicates that the focus of legislative action on protecting the investing public from the effects of conflicts of interest has been misplaced. Allowing commercial and investment banking to take place under one roof did not lead to widespread defrauding of investors. Indeed, our results suggest that the public markets and rating agencies were aware of the potential for conflicts (or weak reputations) of the affiliates and imposed a “lemons market” discount on information-intensive securities

⁴¹There are a variety of other scope-economies arguments that our data do not address. There may be, for instance, economies in combining deposit-taking with the distribution of securities to savers. Also, as White (1986) has found, there may be diversification advantages to a bank combining the two activities.

⁴²Also, the affiliates’ natural securities distribution clientele—depositors—may have been more risk-averse and so less disposed toward buying risky, low-quality, junior claims than the wealthier and more sophisticated individuals with whom the investment banks typically dealt.

⁴³If affiliates did enjoy substantial economies in information-gathering, we would expect them to realize these economies over time by developing expertise in equities and expanding their equity underwriting as the 1920’s progressed. Between 1921 and 1927, affiliates underwrote between zero and three common stock issues each year, rising to seven in 1928 and 11 in 1929 when the overall number of equity issues roughly quadrupled. As a share of the total number of industrial common-stock issues, however, their share fell from 5.2 percent during 1921–1925 to 3.7 percent during 1926–1929. This contrasts with their increasing share of bond originations over the same period.

underwritten by the affiliates. The affiliates appear to have responded to the market's concerns by shying away from information-intensive securities and, instead, underwriting primarily more senior securities and securities of older, larger, and better-known firms than did the investment banks.

While our account of the market's adaptation to the potential for conflicts addresses the policy issue of protecting investors, it also raises questions about the efficiency of underwriting in an universal banking system (see the theoretical arguments made by Crawford and Sobel [1982] and Rajan [1992]). For large, well-known firms, our study suggests that both affiliates and investment banks can efficiently provide underwriting services. For smaller, lesser-known firms, the discount the market imposes on affiliate-underwritten issues suggests that the affiliates may suffer from a lack of credibility. *Ceteris paribus*, affiliates thus would be at a disadvantage vis-à-vis investment banks in competing for their business. If small firms freely choose their underwriters in a competitive market, the fact that some of them choose affiliates suggests that affiliates may have some other cost advantages in underwriting—such as diversification benefits (White, 1986)—which they pass on to the client firm. On the other hand, in circumstances where commercial banks have monopoly power over the smaller, lesser-known firms, some of these firms might be induced to use an affiliate when an investment bank would be a more credible, hence more efficient, underwriter. A way of testing these alternatives is to compare the underwriting fees charged to the smaller, lesser-known firms by affiliates with the fees charged to similar clients by investment banks. A finding that the affiliates' fees in these cases are lower would make the case for Glass-Steagall repeal even more convincing.

The affiliates' credibility problem could be mitigated in two ways. First, banks could be permitted to hold equity in the firms they underwrite. Through their equity stake, banks could signal to the market their beliefs about the firm's prospects (Hayne

Leland and David Pyle, 1977; Rajan, 1992).⁴⁴ Second, the higher disclosure standards and other changes in the regulation of securities markets since the period we study may have increased the credibility of underwriters (see Carol Simon, 1989). Whether these changes are sufficient to enable affiliates to overcome concerns about conflicts of interest in underwriting risky, lesser-known firms awaits examination of more recent data. A study of the foray by investment banks in the late 1980's into a form of universal banking, in which they made bridge loans to firms they were advising and underwriting, could illuminate this issue.

An important question our study raises but does not answer concerns the political considerations behind Glass-Steagall. If the economic rationales given in favor of the Act were not supported by the evidence, why was it passed? Were the alleged abuses simply an excuse for legislators in the 1930's to pursue other goals?

REFERENCES

- Ang, James S. and Richardson, Terry. "The Underwriting Experience of Commercial Bank Affiliates Prior to the Glass-Steagall Act: A Re-examination of Evidence for Passage of the Act." Mimeo, University of Florida, 1993.
- Asquith, Paul; Mullins, David and Wolff, Eric. "Original Issue High Yield Bonds: Ageing Analysis of Defaults, Exchanges, and Calls." *Journal of Finance*, September 1989, 44(4), pp. 923–52.
- Benston, George J. *The separation of commercial and investment banking*. Oxford: Oxford University Press, 1990.
- Bond quotation record*. New York, various issues, 1921–1930.
- Carosso, Vincent P. *Investment banking in America: A history*. Cambridge, MA: Har-

⁴⁴The ability to own equity would not only improve the credibility of the commercial bank's underwriting, but would also align the bank's interests with those of the client firm, thereby mitigating the distortions caused by a potential bank monopoly.

- vard University Press, 1970.
- Chernow, Ron.** *The house of Morgan*. New York: Simon & Schuster, 1991.
- Commercial and Financial Chronicle.** New York, various issues, 1921–1940.
- Crawford, Vincent and Sobel, Joel.** “Strategic Information Transmission.” *Econometrica*, November 1982, 50(6), pp. 1431–51.
- Dewing, Arthur S.** *The financial policy of corporations*, 5th Ed. (2 vols.). New York: Ronald, 1953.
- Edwards, George W.** “The Myth of the Security Affiliate.” *Journal of the American Statistical Association*, June 1942, 37, pp. 225–32.
- Eichengreen, Barry and Portes, Richard.** “After the Deluge: Default, Negotiation, and Readjustment During the Interwar Years,” in Barry Eichengreen and Richard Portes, eds., *The international debt crisis in historical perspective*. Cambridge, MA: MIT Press, 1989, pp. 14–47.
- Fein, Melanie.** “The Separation of Banking and Commerce in American Banking History.” Appendix A to the *Statement by Paul Volcker* before the Subcommittee on Commerce, Consumer and Monetary Affairs of the United States House of Representatives, June 1986, pp. A1–A13.
- Fisher manual of valuable and worthless securities**, Vols. 1–10. New York: Fisher, 1927–1945.
- Fitch’s bond book.** New York: Fitch, 1921–1929.
- Kalbfleisch, J. and Prentice, R.** *The statistical analysis of failure time data*. New York: Wiley, 1980.
- Leland, Hayne and Pyle, David.** “Informational Asymmetries, Financial Structure, and Financial Intermediation.” *Journal of Finance*, June 1977, 32(2), pp. 371–87.
- Macey, Jonathan and Miller, Geoffrey.** *Banking law and regulation*. Boston: Little, Brown, 1992.
- Mintz, Ilse.** *Deterioration in the quality of foreign bonds issued in the United States, 1920–1930*. New York: National Bureau of Economic Research, 1951.
- Moody’s manuals: Industrial, Public utility, Government and municipalities, and Banking and financial.** New York: Moody’s, various volumes, 1921–1941.
- Moore, Terris.** “Security Affiliate versus Private Investment Banker—A Study in Security Organizations.” *Harvard Business Review*, July 1934, 12, pp. 478–84.
- National monthly corporation bond summary.** New York: National Quotation Bureau, various volumes, 1921–1941.
- National monthly stock summary.** New York: National Quotation Bureau, various volumes, 1921–1941.
- National securities dealers of North America (NSDNA).** New York: Siebert, February 1929.
- Olson, James.** *Herbert Hoover and the Reconstruction Finance Corporation*. Ames, IA: Iowa State University Press, 1977.
- Peach, W. Nelson.** *The security affiliates of national banks*. Baltimore, MD: Johns Hopkins University Press, 1941.
- Poor’s industrial section and ratings manuals.** New York: Poor’s, 1921–1941.
- Preston, H. H. and Findlay, A. R.** “Investment Affiliates Thrive.” *American Bankers Association Journal*, May 1930a, 22, pp. 1027–28, 1075.
- _____. “Era Favors Investment Affiliates.” *American Bankers Association Journal*, June 1930b, 22, pp. 1153–54, 1191–92.
- Rajan, Raghuram G.** “A Theory of the Costs and Benefits of Universal Banking.” Center for Research in Security Prices Working Paper No. 346, University of Chicago, 1992.
- Simon, Carol.** “The Effect of the 1933 Securities Act on Investor Information and the Performance of New Issues.” *American Economic Review*, June 1989, 79(3), pp. 295–318.
- U.S. Senate, Committee on Banking and Currency.** 71st Congress, 3rd Session. *Operation of the National and Federal Reserve Systems: Hearings on S.R. 71*. Washington, DC: U.S. Government Printing Office, 1931.
- _____. 72nd Congress, 2nd Session and 73rd Congress, 2nd Session. *Stock exchange practices: Hearings on S.R. 84 and S.R. 56 and S.R. 97*. Washington, DC: U.S. Government Printing Office, 1933–1934.
- U.S. Treasury.** *Final report on the Reconstruction Finance Corporation*. Washington,

- DC: U.S. Government Printing Office, 1959.
- White, Eugene.** *The regulation and reform of the American banking system.* Princeton, NJ: Princeton University Press, 1983.
- _____. "Banking Innovation in the 1920's: The Growth of National Banks' Financial Services." *Business and Economic History*, 1984, 13, pp. 92-104.
- _____. "Before the Glass-Steagall Act: An Analysis of the Investment Banking Activities of National Banks." *Explorations in Economic History*, January 1986, 23(1), pp. 33-55.
- Wigmore, Barrie.** *The crash and its aftermath: A history of securities markets in the United States, 1929-1933.* Westport, CT: Greenwood, 1985.