Journal of Banking & Finance 26 (2002) 689–718

Journal of BANKING & FINANCE

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Debt underwriting by commercial bank-affiliated firms and investment banks: More evidence

Ivan C. Roten [a], Donald J. Mullineaux [b,*]

[a] Appalachian State University, Boone, NC 28608-2058, USA

[b] Gatton College of Business and Economics, University of Kentucky, Lexington, KY 40506-0034, USA

Received 18 February 2000; accepted 27 November 2000

Abstract

We compare underwriting performance by commercial bank-affiliated firms (Section 20s) and traditional investment banks over the period 1995–1998. We find that gross spreads are lower in the case of Section 20 underwritings, but that yield spreads are not. Our sample includes a substantial number of observations following changes in Federal Reserve policies that substantially eased restrictions on Section 20 activities in early 1997. Our findings differ somewhat from results in the literature that focused on periods prior to these policy changes. We find, for example, no evidence that a prior commercial bank lending relationship influences underwriting yields for any type of issue. Our results also fail to confirm earlier evidence that collective Section 20 underwritings produce a favorable competitive effect on gross spreads and yield spreads. We find substantial evidence that both the underwriting mix and the underwriting process are relevant to the behavior of gross spreads and yield spreads over the sample period. © 2002 Elsevier Science B.V. All rights reserved.

JEL classification: G12; G21; G24; G30; D82

Keywords: Debt underwriting; Section 20 subsidiaries; Gross spreads; Yield spreads; Bank holding companies

* Corresponding author. Tel.: +1-859-257-2890; fax: +1-859-257-3654.

E-mail address: mullinea@uky.edu (D.J. Mullineaux).

0378-4266/02/$ - see front matter

PII: S0378-4266(01)00163-7

1. Introduction

Commercial banking organizations have been heavily engaged in underwriting corporate securities issues in the 1990s, despite the apparent prohibition on such activities by the Glass–Steagall Act of 1933. Bank holding companies gained entry into the underwriting business when the Federal Reserve modified its interpretation of Section 20 of the Act which prohibits banks from being affiliated with any organization that is "engaged principally" in underwriting or dealing in securities. In 1986, the Fed permitted securities subsidiaries of bank holding companies to underwrite and deal in certain bank ineligible securities, provided that revenues from such underwritings constituted less than 5% of the subsidiary's gross revenue. [1] The holding company subsidiaries that engage in such activities are commonly referred to as "Section 20 subsidiaries".

In the interim, the Federal Reserve has enlarged the set of allowable underwritings and raised the allowable revenue limit. In 1989, the Fed permitted corporate bond underwriting and, in 1990, issues of equity securities. In January 1989, J.P. Morgan Securities underwrote the first public corporate bond issue by a commercial banking organization since the Glass–Steagall Act. In 1989, the Fed raised the revenue ceiling on ineligible underwritings to 10%. Effective in early 1997, the Fed again increased the limit to 25% and relaxed a set of restrictions ("firewalls") on interactions between a Section 20 subsidiary and an affiliated bank. The Board eliminated restrictions on a bank engaging in marketing activities on behalf of an affiliated Section 20, loosened restrictions on interlocks between directors, officers and employees of a Section 20 subsidiary and an affiliated bank (which had been strictly prohibited), and eased constraints on the purchase and sale of financial assets between a Section 20 subsidiary and an affiliated bank. The amount of commercial bank-related underwritings has increased substantially in the late 1990s. During 1998, for example, three of the top 10 underwriters of US stocks and bonds by dollar volume were affiliated with bank holding companies (Salomon Smith Barney, JP Morgan, and Chase). As of June 1999, 51 Section 20 subsidiaries were owned by bank holding companies. Underwriting activities by commercial bank-related organizations are likely to increase further since the formal repeal of the Glass–Steagall Act by the Gramm–Leach–Bliley Financial Modernization Act of 1999.

[1] The initial authority allowed underwriting and dealing in commercial paper, certain municipal revenue bonds, conventional residential mortgage-related securities, and securitized consumer loans. The set of securities that Glass–Steagall did not classify as ineligible for bank-related underwritings include US Treasuries, US agency securities, and general-obligation municipal securities.

The finance literature has examined the performance of commercial bank-related underwritings both before and after Glass–Steagall. A consensus has formed that the legal restrictions placed on underwritings by commercial banking organizations in 1933 were probably misguided (see Kroszner and Rajan, 1997; Benston, 1990). There are only a few papers examining the performance of Section 20 debt underwritings in the 1990s. While these studies provide useful information, the research largely is limited to a period when commercial banks were relatively new entrants into debt underwriting. They do not address some major changes in underwriting processes and the mix of public debt issues in the 1990s, in particular the growth in shelf registration and in the medium-term note (MTN) market.

In this paper, we first examine whether the results observed for the relatively early period of commercial bank entry into debt underwriting continue to hold after the Federal Reserve eased restrictions on these activities and Section 20 firms "matured" as debt underwriters. For this analysis, we estimate models that are quite similar to those estimated by Gande et al. (1997, 1999). We next estimate models with more extensive specifications to determine whether shifting trends in capital markets affect either the performance of underwriters in general over the period or the conclusions drawn from the more restricted model estimations.

We find that Section 20 subsidiaries underwrite debt with significantly lower gross spreads than investment banks over our sample period, which includes a number of observations following changes in Federal Reserve policies that eased restrictions on Section 20 activities in early 1997. Yield spreads do not differ by underwriter type, however. Our findings differ somewhat from earlier results in the literature. We find that the existence of a commercial bank lending relationship does not influence underwriting yields over our sample period, even for non-investment grade issues. Gande et al. (1997) found contrary results over an earlier sample period. Our results also fail to support the hypothesis of a favorable competitive effect on gross spreads and yield spreads stemming from collective Section 20 activity. The effects identified by Gande et al. (1997) do not continue into our sample period, as the authors speculated might prove to be the case.

2. A brief review of the literature

Several papers examine the underwriting activities of firms affiliated with commercial banks both before and after the Glass–Steagall Act of 1933. Ang and Richardson (1994), Kroszner and Rajan (1994) and Puri (1994) find that, in the period prior to Glass–Steagall, debt underwritten by commercial banks was less likely to involve default than debt sold by investment banks. Puri (1996) also finds that debt underwriting by commercial banks involved higher prices (lower yields) ex ante than debt underwritten by investment banks over the same period. She argues that commercial banks provide a "net certification effect" since they can gain access to information about the borrower through lending and/or deposit relationships that is not available to investment banks. The literature finds that conflicts of interest were not a significant problem between investors and commercial bank underwriters in the pre-Glass–Steagall period. Kroszner and Rajan (1997) argue that the market developed mechanisms that suitably the resolved conflict of interest problems and that the Glass–Steagall restrictions were largely unnecessary.

Since commercial banking organizations have re-entered the underwriting business, several papers have focused on aspects of their activities. Gande et al. (1997) examine the relative characteristics of the debt securities underwritten by Section 20 affiliates compared to investment bank underwritings and test for differences in debt pricing between commercial and investment bank organizations. They find that Section 20 firms are more heavily focused on smaller and riskier issues and that commercial bank-affiliated underwritings involve lower yields, at least for firms with relatively low credit ratings. Their sample period (1993 to the first quarter of 1995) is prior to the Fed's second relaxation of restrictions on underwriting revenues and easing of firewall restrictions on relations between Section 20 firms and their affiliated banks. Gande et al. (1997) suggest that their findings are consistent with an "implicit breach" of the firewalls in that borrowers with lower credit ratings and some outstanding loan exposure to the bank subsidiary of the holding company gain lower yields on their underwritings compared to firms which rely on investment bank underwritings. Their results are consistent with information flows between the underwriting and bank affiliates of the holding company, despite the restrictions on information sharing, and are inconsistent with the "conflict-of-interest" hypothesis.

Gande et al. (1997) also test the hypothesis that more "reputable" underwriters will generate lower yields for borrowers. They use a non-continuous measure of market share to proxy for reputation and find that lower yield spreads are associated with higher market share, but only in the case of lower-rated firms. Livingston and Miller (2000) also examine the impact of reputation in underwriting debt securities. They find slightly lower gross spreads and lower yields on underwritings by more "prestigious" firms. Livingston and Miller (2000) do not discriminate, however, between commercial bank and investment bank underwriters in their study, although one of the top 10 debt underwriters (J.P. Morgan) in their sample was a Section 20 firm over their sample period 1990–1997, and two have subsequently become so (Salomon Brothers and Dillon Reed).

Gande et al. (1999) extend their earlier research to examine the competitive impact of commercial bank entry into debt underwriting on gross underwriter spreads as well as yield spreads. The sample period covers the period 1985–

1996, ending just prior to the Fed's easing of restrictions on Section 20 underwriting activity. The authors find no significant differences between gross spreads associated with commercial and investment bank underwriters, although they do observe that entry by Section 20 firms has resulted generally in lower gross spreads (for smaller issues at least), presumably as a result of increased competition. [2] The authors also find that yield spreads are lower, on average, as the share of commercial bank underwritings increases relative to investment bank underwritings. The yield results hold across firms with different credit ratings and different issue sizes. Their market share variable is computed at the industry level and consequently varies only from year-to-year. Their model does not reveal whether yield spreads differ specifically between Section 20 and investment banking firms. [3] The Gande et al. (1999) paper does not control for the relevance of any prior lending relationship between the bank underwriter and the issuer, perhaps because in their earlier paper this variable was significant only for low-quality issuers.

The existing literature implicitly treats all non-convertible public debt offerings as homogeneous and does not control for either the size of the issue filing or whether the issue is shelf registered. However, an increasing proportion of debt issues in recent years represents MTNs. According to the Board of Governors of the Federal Reserve, issues of MTNs increased from $31 billion in 1988 to $150 billion in 1998. MTNs are issued primarily by investment grade companies and in maturities ranging from 270 days to 40 years. Relative to other types of debt instruments, MTNs, on average, are more likely to be shelf registered and to have higher credit ratings. [4] We account for MTNs in our expanded specification with a dummy variable to determine whether gross spreads or yield spreads vary for this kind of investment relative to traditional debt securities. We also include the file amount as a variable in the model and account for whether the issue is shelf registered. These factors are somewhat related, since the file amount is typically greater than the issue size on shelf-registered bonds and because MTNs are usually shelf registered. Our estimation results reveal that each factor plays an independent role in terms of an influence on gross spreads and yields, however.

[2] Gande et al. (1999) find that the decline in debt underwriting spreads in response to commercial bank entry does not carry over to equity underwritings.

[3] While the authors include an intercept dummy for Section 20/non-Section 20 firms in their gross spread equation (which is not significant), they exclude such a variable in the yield spread equation.

[4] Some studies (Kadapakkam and Kon, 1989; Blackwell et al., 1990) have found that shelf-registered bonds have lower yields than non-shelf offerings. Crabbe and Turner (1995) find that MTNs and bonds with like characteristics have statistically identical yields, but Mullineaux et al. (2000) observe some significant differences in gross spreads and yield spreads on MTNs vs. other debt instruments.

3. Hypotheses

3.1. Pricing differences at Section 20 subsidiaries

We analyze Section 20 underwritings relative to those of investment banks during the sample period to test for potential differences in underwriting spreads and yields. We hypothesize that underwriter affiliation with a bank holding company will be associated with lower underwriting fees and yield spreads. Commercial banks obtain information through loan monitoring and daily bank transactions that is not available to investment banks. Fama (1985) distinguishes "inside" from "outside" debt and emphasizes that commercial banks gain access to information not routinely available to capital market participants. Like Gande et al. (1997), we take account of existing relationships between issuers and commercial banks that are affiliated with the underwritings in question. The loan syndication process also can make some of this information available even when banks lack direct relationships with borrowers. This inside information has the potential to decrease the fees associated with bank-affiliated underwritings in comparison to investment bank underwritings, especially in the period following relaxed restrictions on information sharing between the Section 20 affiliate and the bank subsidiaries of the holding company. We hypothesize that yields are lower at Section 20 firms for similar kind of reasons. [5] Section 20 fees and yields also might be lower as a result of factors such as: (1) a strategy involving "below market" pricing to create a lock-in effect; (2) potential advantages associated with the bank holding company's distribution network; or (3) an enhanced capacity to cross-sell in the period following relaxation of the firewalls. James (1992) analyzes "initial engagement discounting" in the IPO market and finds evidence in favor of the relevance of lock-in effects in the presence of re-usable information. We use dummy variables to test the hypothesis that Section 20 underwritings involve lower gross spreads and lower yield spreads than investment bank issues, other things being equal.

3.2. Competition and potential convergence

Entry by commercial bank-affiliated firms into the securities underwriting business increased competition in the industry. Gande et al. (1999) report evidence that underwriting spreads and yield spreads declined significantly over the period 1985–1996 as the market share of Section 20 affiliates increased.

[5] An alternative hypothesis is that bank-affiliated underwriters may exploit their customers in light of the inside information (Puri, 1996), but neither the pre- nor the post-Glass–Steagall evidence supports this notion.

They also find that concentration in the debt underwriting market declined as evidenced by a declining market share of the top five underwriters and a declining Herfindahl index. They note that "it is somewhat early to assess the long-term impact of the bank underwriting on market concentration" and that "whether bank entry will have an anti-competitive long-term effect, pushing traditional investment banking firms out of the market, poses an interesting issue for research in future years". The end of the sample period in the Gande et al. (1999) study precedes significant policy changes implemented by the Fed in early 1997 that substantially enhanced the capacity of commercial bank-affiliated underwriters to compete with traditional investment banks. In our sample, the market share of Section 20 affiliates trends up monotonically from 1995 (19.3%) to 1998 (27.6%), but the Herfindahl index is higher in 1998 than in 1995. To confirm that the concentration measure was not sample specific, we calculated the Herfindahl index for all debt underwritings over the sample period. The results were unchanged, suggesting that concentration in the debt underwriting market did not continue to decline during our sample period. The hypothesis we test is that gross spreads and yield spreads decline with increases in the collective market share of Section 20 subsidiaries.

3.3. Revenue ceiling increase and relaxation of firewalls

Effective in the first quarter of 1997, the Federal Reserve raised the limitation of allowable revenues for Section 20 firms and relaxed the firewall restrictions on relations between Section 20 subsidiaries and their affiliated banks. We hypothesize that the increased revenue limits for the Section 20 underwriters and relaxed firewalls will result in decreased underwriting fees for issuers. The hypothesized negative effect on underwriting fees could be due to an increase in competition facilitated by the revenue limitation. The Fed's relaxation of firewalls also could result in lower gross and/or yield spreads. These changes allowed for increased sharing of information by loosening restrictions on director, manager, and employee interlocks between the underwriting affiliate and the bank subsidiary of the holding company and on asset sales between a Section 20 affiliate and the affiliated bank. If these restrictions were binding, an increased flow of inside information could result in lower gross or yield spreads. Gande et al. (1997) view their findings that yield spreads were lower for Section 20 firms relative to traditional investment banks (for below-investment grade borrowers) as implicit evidence the firewalls were non-binding. We can test the hypothesis more explicitly here by examining whether gross spreads or yield spreads for Section 20 firms were influenced by these regulatory changes. We use a dummy variable (FRB-SHIFT) to determine if there is a difference in gross or yield spreads over the two periods.

4. Data and sample selection

Information about debt underwritings was obtained from the Securities Data Corporation (SDC). The sample is gathered from the US domestic public new-issues database of SDC. The database is constructed from regulatory filings, news sources, company press releases, and prospectuses. Gande et al. (1997, 1999) used this data source in their research concerning Section 20 underwritings.

The following criteria guided our data collection process. First, the sample period should consist of approximately equal periods before and after the Fed's increase in the revenue ceiling to 25% for ineligible underwritings by Section 20s and the easing of the firewall restrictions on interactions between Section 20 firms and their affiliated banks. Both these events became potentially relevant in the first quarter of 1997. Second, the individual underwriting data must contain the gross spread, yield spread, credit rating, issue size, file size, maturity, industry, and seniority of the issue. Third, the length of the sample should be long enough to include a significant number of Section 20 and investment bank underwritings.

Given the sample criteria, the sample period is defined as 1 January 1995–31 December 1998. The sample period allows approximately two years before and after the Fed's raising of the Section 20 revenue cap and easing of the firewall constraints. The sample also is limited to fixed-rate, non-perpetual debt issues with a single maturity. Finally, to counter the problem of interpreting results involving co-managed issues, the sample excludes underwritings with more than one book manager. [6] The resulting total sample consists of 3626 US nonconvertible fixed-rate debt issues. The extant literature excludes issues by financial and regulated firms (SIC codes 4 and 6) and consequently we will do likewise. This reduces the sample size to 1362 observations. [7] Descriptive statistics for the sample are presented in Table 1.

In Table 1 we present data for the sample, and for sub-samples reflecting Section 20 underwritings and "traditional" investment bank (non-Section 20) issues. We also provide the *t*-statistics relevant to the test of the hypotheses of equality of means across the two sub-samples. The mean gross spread for commercial bank-affiliated issues is significantly lower than that for investment bank underwriters, but yield spreads do not differ across underwriter types. The average gross spread of 92 basis points is well below the average under-

[6] Less than 1% of our sample is associated with multiple book managers. We exclude them because, in a number of instances, the book management "team" consisted of Section 20 and investment banking firms.

[7] The primary factor causing the exclusion of underwritings from the sample was the lack of a credit rating. The sample size in Gande et al. (1997) was 670, and in Gande et al. (1999) there were 2992 observations.

Table 1
Variable means for the full sample and the sub-samples of Section 20 and investment bank underwriters and *P*-value results[a]

Variables	All underwriters Number of issues: 1362	Section 20 321	Non-Section 20 1041	Difference *P*-value
GROSS SPREAD (%)	0.92	0.84	0.94	0.024
YIELD SPREAD (bps)	130.12	129.28	130.38	0.891
ISSUE AMOUNT ($ mill)	176.85	113.88	196.27	0.000
FILE AMOUNT ($ mill)	933.01	727.66	996.34	0.000
MATURITY (yrs.)	14.40	11.30	15.36	0.000
MTNs (%)	22.10	38.94	16.91	0.000
SENIOR (%)	95.23	94.39	95.49	0.423
INVEST GRADE (%)	82.09	83.80	81.56	0.360
SMALL ISSUERS (%)	29.88	30.22	29.78	0.881
LARGE ISSUERS (%)	39.21	36.76	39.96	0.305
REPUTATION (%)	11.15	5.07	13.03	0.000

[a] GROSS SPREAD is the difference between the offered amount and the proceeds to the issuer as a percentage of the issue size. YIELD SPREAD is the difference in the ex ante yield of the debt issue in comparison to the ex ante yield spread of a US Treasury security of comparable maturity. ISSUE AMOUNT is size of the issue in millions of dollars. FILE AMOUNT is size of the SEC filing in millions of dollars. REPUTATION is the market share of the underwriting book manager in the year of the issue. MATURITY is the number of years until final maturity. MTNs (%) is the percent of MTNs in the sample. SENIOR is the proportion of issues that involve priority over other creditors. INVESTMENT GRADE is the percentage of issues rated Baa or above by Moody's. SMALL ISSUERS is the proportion of issues less than $300 million in size, and LARGE ISSUERS is the percentage greater than $750 million. REPUTATION is the market share of the underwriter in the year of issue.

writer spread reported by Livingston and Miller (2000) of 111 basis points and by Gande et al. (1999) of 132 basis points, but both of these studies involve longer and earlier sample periods. As Fig. 1 shows, gross spreads have trended down since early 1996. [8] The average yield spread of 130 basis points is likewise well below the 169 basis point mean reported in Livingston and Miller (2000). Yield spreads are cycling over our sample period, as demonstrated in Fig. 1. The average issue size is $177 million and the average file amount is $933 million. The average issue and average file size are both significantly lower for Section 20 underwriters. The mean maturity is roughly 14.5 years in the full sample, but is significantly lower (11.3 years) at the Section 20s, perhaps because of a difference in the underwriting mix. About 22% of the sample issues

[8] The market share values for the Section 20 underwriters over our sample period are 11.2% for 1995, 15.8% for 1996, 13.6% for 1997, and 18.8% for 1998.

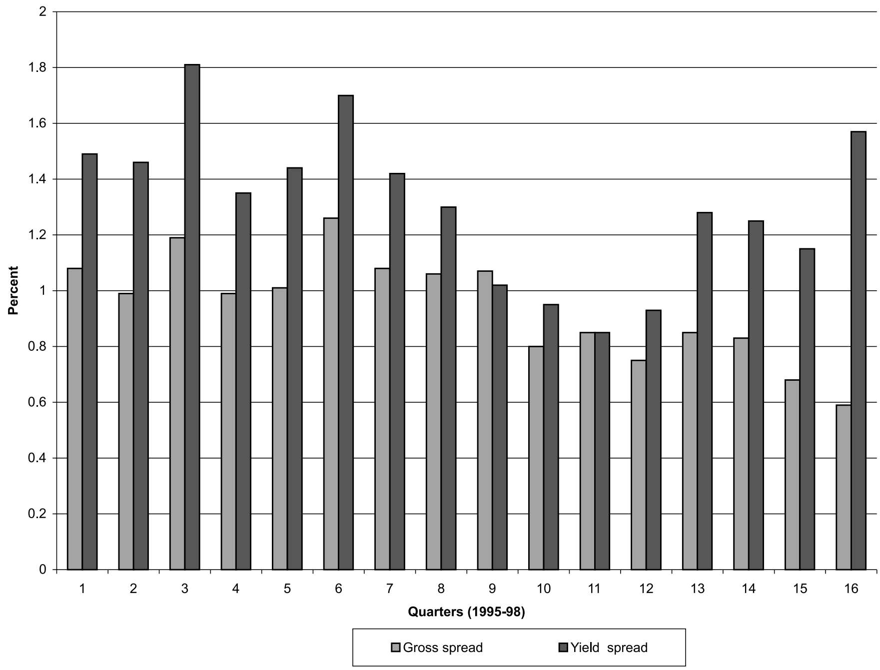

Fig. 1. This figure shows the gross spreads and yield spreads on a quarterly basis over the sample period. Gross spread is the difference between the offering amount and the proceeds to the issuer as a percentage of the issue size. Yield spread is the difference in the ex ante yield of the specific debt issue in comparison to the ex ante yield of a US Treasury security of comparable maturity (100 basis point spread is converted to 1%).

are MTNs, but MTNs account for a significantly larger proportion of Section 20 underwritings (39%) than of investment banks (17%). [9] Most of the debt issues are senior (95%) and there is no significant difference in debt issue priorities across the sub-samples. The two types of firms underwrite similar proportions of investment grade issues and non-investment grade issues, and there are no significant differences in the percentage of small or large issues across underwriting types. The finding of Gande et al. (1999) that Section 20

[9] It is not clear why Section 20 subsidiaries have a stronger focus on the MTN sector of the market. One reason may be that MTN issues often involve a process known as "reverse inquiry". In this situation, an investor approaches an underwriter seeking a tailored security. The underwriter then seeks a firm willing to issue the required amount of debt with the desired characteristics. Bank-affiliated underwriters may have sought to use this process as a strategy for enhancing market share, especially where their existing network of relationships may have facilitated this strategy.

firms focus more heavily on smaller, riskier issues does not hold in our sample, which covers a period three years beyond the end of their sample.

The average market share of commercial bank-affiliated underwriters (5.1%) is significantly lower than the mean share of investment banks (13.0%), which is not surprising given the relatively recent entry by commercial-bank organizations into the underwriting business. For the sample period as a whole, Section 20 affiliates underwrote 22.6% of the total debt issues, well above the 7% average share reported by Gande et al. (1999) in the 1985–1996 period.

5. Methods

5.1. Underwriting fees and yield spreads

We use an OLS regression to estimate the determinants of the underwriting fees and yield spreads in a multivariate context. The OLS model employs Newey–West heteroscedastic consistent *P*-values to adjust for understated standard errors. [10] One dependent variable, GROSS SPREAD, is the difference between the offering price and the proceeds to the issuer as a percentage of the issue size. The other, YIELD SPREAD, is the difference in the ex ante yield of the specific debt issue in comparison to the ex ante yield of a US Treasury security of comparable maturity. The independent variables capture certain characteristics of the issuer, the issue, and the underwriter, as well as variables that control for industry and time effects. We first identify the variables that are most relevant to our underlying hypotheses. The independent variables in the model are:

SECTION: A dummy variable that is 1 if the underwriting book manager is a Section 20 underwriter and 0 otherwise. [11]

LN(SMKT): The natural log of the percentage market share of all Section 20 underwriters in the year of the issue.

LN(STAKE): Following Gande et al. (1997), the natural log of 1 plus STAKE, the lending exposure of the Section 20 subsidiary's affiliated commercial bank to the issuer of the debt claim. [12]

[10] The lag length for the Newey–West correction is set to zero for the estimations presented. Lag lengths of 1 and 2 were also examined in the analysis and the results were quantitatively and qualitatively unchanged.

[11] In cases where a bank holding company acquires an investment bank, the dummy variable takes on a value of zero before the acquisition date and one following the acquisition. Whether such acquisitions influence underwriter behavior is an interesting issue and will be a topic of future research.

[12] We thank the referees for suggesting that we examine the effects of this variable and thank Mark Carey for providing the necessary data.

FRBSHIFT: A dummy variable that is 1 for any issue underwritten after the Fed's relaxation of revenue limits and firewalls in 1997Q1 and 0 otherwise.

LN(ISSUE): The natural log of the size of the issue (millions of dollars).

LN(FILE): The natural log of the size of the issuer's filing with the SEC (millions of dollars).

MATURITY: A set of three dummy variables based on the maturity of the issue. HIMAT is 1 if the maturity is greater than 15 years. MIDMAT is 1 if it matures in 5–15 years. LOWMAT is 1 if the maturity is less than 5 years. The dummy variables are 0 otherwise.

LN(MAT): The natural log of the time (in years) from issue date until maturity.

REFINANCE: A dummy variable that is 1 if the purpose of the funding is to repay bank debt and 0 otherwise.

EXCHANGE: A dummy variable that is 1 for issuing firms listed on an exchange and 0 otherwise.

SENIOR: A dummy variable that is 1 if the debt is senior and 0 otherwise.

REPUTATION (REP): The market share of the underwriting book manager in the year of the issue.

RATING: A set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on Moody's credit rating for the debt issue.

INDUSTRY: A set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, SIC2 is 1 for a firm with an SIC code beginning with a 2 and 0 otherwise.

MTN: A dummy variable that is 1 if the issue is a medium-term note and 0 otherwise.

SHELF: A dummy variable that is 1 if the issue is shelf registered and 0 otherwise.

QUARTER: A quarterly trend variable. For example, QUARTER is equal to 7 if the issue is underwritten in the third quarter of 1996.

ISSUE DATE: A set of 16 quarterly dummy variables (ISSQ1, ISSQ2, ..., ISSQ16) indicating the quarter when the issue was underwritten. For example, ISSQ7 is 1 for all issues underwritten in the third quarter of 1996 and 0 otherwise.

5.2. Discussion of variables

Gande et al. (1997) found that the log of STAKE was negatively related to the yield spread of the debt issue, reflecting the likely presence of superior information at Section 20 underwriters and consequent certification effects. The construction of this variable takes into account whether a lending relationship exists between an issuer and a bank and the size of any such loan exposure. The dummy variable EXCHANGE is also a proxy for the availability of information about the issuer. Firms that are exchange traded are better known in the market and consequently can be more readily evaluated. Therefore, the coefficient of this variable should also be negative. The REFINANCE variable was employed by Gande et al. (1997) to examine the potential for conflicts of interest. If investors interpret the use of capital market finance to pay off bank debt as exploitative, then financing of this type should have higher yield and gross spreads.

The Section 20 dummy variable (SECTION) is expected to reveal a lower fee and lower yield for Section 20 underwriters in comparison to investment banks for reasons documented above. The variable LN(SMKT) is the natural log of market share of all Section 20 underwriters, a variable employed by Gande et al. (1999) as a proxy for the impact of enhanced competition on gross and yield spreads. The coefficient of this variable should be negative if the positive impact of competition continued beyond the end of their sample period. The FRBSHIFT dummy variable is included to determine whether there are potential differences in underwriting fees and yields in the period before and after the Fed relaxed revenue and firewall restrictions. We hypothesize that the coefficient will be negative, since the sizable increase in allowable underwritings should have increased competition between Section 20 and non-Section 20 firms. The reputation variable (REP) tests for a negative relation between firm-level market share and both spreads for each type of underwriter.

The log of the issue size [LN(ISSUE)] measures potential economies of scale for large issues. Larger issues also are likely to be less information problematic and more liquid, so larger issues should be associated with lower gross spreads and yield spreads. There is some potential for higher fees on large issues of non-investment grade issues, however, due to non-placement risk. The amount filed with the SEC [LN(FILE)] could be a proxy for firm size and the ability to raise capital from the market or it could also be a measure of scale economies. The larger the file amount, we hypothesize, the lower will be the gross and yield spreads. File size and issue size are not highly correlated in our sample. The correlation coefficient for ISSUE and FILE is 0.321, and it is 0.119 for the natural log of the same variables. The size of the file has been ignored in the underwriting literature to date. Issue size and file size are most likely to diverge in the case of shelf-registered issues. Consequently, we also include a dummy variable (SHELF) reflecting whether the issue is shelf registered, with a hypothesized negative sign. By including this set of variables, we can examine whether scale economies are more relevant in the registration phase of an underwriting (file size) or in the distribution phase (issue size) or both. We can also determine whether the type of registration plays a role independently of any scale economies channel.

Maturity should affect the underwriting cost and yield since there is an increased probability of default associated with longer maturities (Flannery, 1986). Consequently, as the maturity of the issue increases, the underwriting fee and yield spread should increase, but in a non-linear way. Theoretical support for a concave relationship between yield and maturity is provided by Diamond (1991) and empirical support for the same by Dennis et al. (2000). The SENIOR dummy is expected to have a negative coefficient. The underwriting fee and yield spread of senior debt are expected to be less than those of subordinate debt since the underwriter's placement risk would be lower on senior debt. The MTN dummy variable is included to detect potential differences between MTNs and other debt issues. A substantial proportion of the sample consists of MTNs. Since these securities are more likely to be shelf registered, the gross spreads on MTNs may be lower than on other debt issues. Since SHELF is itself a variable in the model, however, the results will reveal whether other characteristics of MTNs influence gross spreads and/or yield spreads. [13]

The credit rating of the issue reflects the greater cost of placement to the underwriter as the rating declines. [14] Lower credit ratings should involve higher underwriting fees and yield spreads. Industry variables are included to capture potential differences in underwriting fees and yields across primary SIC codes. QUARTER in a trend variable is similar to that employed by Gande et al. (1999), although their's was an annual trend variable. Finally, the ISSUE dummy variable will be used in the yield spread analysis to control for the relevance of rate cycles in the market over the sample period.

6. Empirical results

6.1. Gross spread

6.1.1. Parsimonious model

Our initial estimates examine whether the results obtained by Gande et al. (1997, 1999) in previous research continue to hold over a period that includes a substantial number of observations from the period following the Fed's relaxation of restrictions on Section 20 underwritings. We employ their model in several instances where they did not, however. Their initial paper focused only on yield spreads, for example, but we estimate a similar model for both gross and yield spreads. Also, while they did not include the extent of any prior bank lending relationship (as reflected by the value of LN(STAKE)) in their 1999 paper analyzing the role of competition, we examine its impact in our estimations.

[13] The correlation coefficient between the MTN dummy variable and the SHELF dummy variable is 0.225, suggesting that while almost all MTNs are shelf registered, many shelf offerings are not MTNs.

[14] Seven credit quality dummies are used to classify the data. The AAA dummy is excluded and its impact is consequently impounded in the intercept term.

Table 2
Estimation results for gross spread: Parsimonious model[a]

Variable	Equation							
	A		B		C		D	
	Coeff.	*P*-value[b]	Coeff.	*P*-value[b]	Coeff.	*P*-value	Coeff.	*P*-value[b]
CONSTANT	0.955	0.000	1.016	0.000	0.993	0.000	0.978	0.000
SECTION			−0.080	0.011				
LN(SMKT)					−0.016	0.841	−0.018	0.818
LN(STAKE)	−0.01	0.042	0.002	0.809	−0.010	0.042		
EXCHANGE	−0.003	0.905	−0.005	0.86	−0.003	0.909	−0.002	0.924
LN(ISSUE)	0.021	0.000	0.019	0.001	0.021	0.000	0.023	0.000
REFINANCE	0.003	0.918	0.002	0.931	0.003	0.906	0.001	0.959
SENIOR	−0.285	0.001	−0.288	0.001	−0.285	0.001	−0.282	0.001
Aa	−0.020	0.816	−0.048	0.547	−0.021	0.810	−0.025	0.77
A	−0.034	0.694	−0.06	0.449	−0.035	0.688	−0.038	0.651
Baa	0.006	0.945	−0.017	0.828	0.005	0.950	0.001	0.992
Ba	0.857	0.000	0.834	0.000	0.857	0.000	0.856	0.000
B	1.982	0.000	1.953	0.000	1.982	0.000	1.981	0.000
C	2.190	0.000	2.176	0.000	2.189	0.000	2.199	0.000
REP	−0.003	0.009	−0.004	0.001	−0.003	0.010	−0.002	0.031
HIMAT	0.203	0.000	0.201	0.000	0.203	0.000	0.203	0.000
LOWMAT	−0.202	0.000	−0.204	0.000	−0.202	0.000	−0.203	0.000
QUARTER	−0.004	0.042	−0.003	0.080	−0.003	0.328	−0.003	0.335
Observations	1362		1362		1362		1362	
Adjusted R^2	0.8167		0.8178		0.8170		0.8167	

[a] The table gives the OLS estimates for the following equation:

$$\begin{aligned}\text{GROSS SPREAD} = {} & \beta_0 + \beta_1\,\text{SECTION} + \beta_2\,\text{LN(SMKT)} + \beta_3\,\text{LN(STAKE)} \\ & + \beta_4\,\text{EXCHANGE} + \beta_5\,\text{LN(ISSUE)} + \beta_6\,\text{REFINANCE} + \beta_7\,\text{SENIOR} \\ & + \beta_{\text{rate}}\,\text{CREDIT RATING} + \beta_8\,\text{REP} + \beta_{\text{MAT}}\text{MAT} + \beta_9\,\text{QUARTER} \\ & + \beta_{\text{SIC}}\,\text{INDUSTRY}.\end{aligned}$$

GROSS SPREAD is the difference between the offered amount and the proceeds to the issuer as a percentage of the issue size. The independent variables are: SECTION is a dummy variable that is 1 if the underwriting book manager is a Section 20 underwriter and is 0 otherwise. LN(SMKT) is the natural log of the percentage market share of all Section 20 underwriters in the year of the issue. LN(STAKE) is the natural log of 1 plus STAKE, the lending exposure of the Section 20 subsidiary's affiliated commercial bank to the issuer of the debt claim. EXCHANGE is a dummy variable that is 1 for issuing firms listed on an exchange and 0 otherwise. LN(ISSUE) is the natural log of the size of the issue in millions of dollars. REFINANCE is a dummy variable that is 1 if the purpose of the funding is to repay bank debt and 0 otherwise. SENIOR is a dummy variable that is 1 if the debt is senior and is 0 otherwise. CREDIT RATING is a set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on Moody's credit rating for the debt issue. For example, A is a dummy variable that is 1 if the Moody's rating for the issue is A1, A2, or A3 and is 0 otherwise. REP is the ratio of total issues ($ yearly) by the underwriter to the total issues ($ yearly) in thesample. MATURITY is a set of three dummy variables based on the maturity of the issue. HIMAT is 1 if the maturity is greater than 15 years. MIDMAT is 1 if it matures in 5–15 years. LOWMAT is 1 if the maturity is less than 5 years. The dummy variables are 0 otherwise.

Table 2 (*continued*)
QUARTER is a quarterly trend variable. For example, QUARTER is equal to 7 if the issue is underwritten in the third quarter of 1996. INDUSTRY is a set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, if SIC2 is 1 for a firm with an SIC code beginning with an SIC code of 2 and is 0 otherwise. *P*-values are presented for significance levels using a two-tailed test.
[b] Newey–West heteroscedastic consistent standard errors were used to calculate *P*-value.

The results of four alternative specifications are reported in Table 2, since the tests for relevance of underwriter type (SECTION) and for the influence of competition (SMKT) must be examined independently. [15] Equation A is quite similar to the model estimated in their 1997 paper. One difference is that they included a variable reflecting whether the debt was secured. We exclude this variable (which is not available from the SDC database), as did Gande et al. in their 1999 paper. We also include a dummy variable indicating whether the debt issue holds a senior position to other debt, which Gande et al. did not. We also include a trend variable in the model. Gande et al. (1999) employs a trend factor, but Gande et al. (1997) does not, presumably because of the short time horizon (1993–95) of their sample. We find that the presence and scale of a prior banking relationship as reflected by the coefficient of LN(STAKE) has a favorable impact on gross spreads in the specifications that exclude the Section 20 variable. This is similar to the results found by Gande et al. (1997) for yield spreads. The impact of the borrower's information status as reflected by whether their stock trades on an exchange, as well as the effect of issue size, is counter to our hypotheses and to their results and both coefficients are significant. The effects of maturity and reputation are as anticipated and are significant. [16] The credit rating variables are significant only for issues rated below investment grade. The coefficient of the refinancing dummy is insignificant, indicating that a specified intention to use the funds to repay bank debt does not influence underwriter fees. When we include a dummy variable for Section 20 firms in Equation B, it is negative and highly significant, suggesting that commercial bank-affiliated underwriters charge lower fees than investment banks over the period. The remaining results are quite robust to the inclusion of this variable, save for the variable LN(STAKE). [17] When we replace the Section 20 variable with a measure of overall market share [LN(SMKT)] in Equation C, the coefficient of this variable is likewise negative, but insignificant. These initial results suggest that the pro-competitive effect identified by Gande et al. (1999) does not continue into the period beyond their sample,

[15] We are grateful to the referees for emphasizing this point.
[16] The results for reputation are robust to the proxy used by Gande et al. (1997).
[17] The variable LN(STAKE) and the Section 20 dummy are fairly highly correlated ($\rho = 0.65$). We further explore the role of these variables below in our extended specification.

at least in the case of gross spreads. [18] When we include only the Section 20 market share variable in Equation D (a specification similar to Gande et al. (1999)), the coefficient is again insignificant and the remaining coefficients are unaffected.

6.1.2. Expanded specification

The models we estimate in Table 2 may exclude factors that have become significant influences on underwriter performance, however. We next estimate specifications that include file size as well as issue size and that include dummy variables reflecting whether the individual issue is shelf registered and whether the issue is a MTN. We also include the FRBSHIFT variable in the model. [19] The results are reported in Table 3, where we again report separate equations testing for differences in fees by underwriter type and for the relevance of increased competition. We continue to find in Equation A that Section 20 affiliates charge lower gross spreads, perhaps reflecting a strategy designed to lock-in issuing firms or other marketing-related advantages. [20] Again, there is no favorable competitive impact of Section 20 activity on gross spreads in Equation B of the expanded model. The coefficient of FRBSHIFT is likewise insignificant, suggesting that the Federal Reserve's policy changes in 1997 did not affect fees charged by underwriters. The existence of a prior banking relationship again does not affect underwriting fees in their models, nor does the status of the issuer as exchange traded. The refinancing dummy variable remains insignificant as well, as it was in the parsimonious model. The results also show that the file size is a more significant factor than issue size (with the hypothesized sign), which suggests that scale economies may be more relevant to gross spreads in the registration phase of underwriting than the distribution phase. Shelf registration and designation of the issue as an MTN both have

[18] The time trend variable and LN(SMKT) are highly correlated ($\rho = 0.81$) in our sample. If we exclude the trend variable, then the coefficient of the Section 20 variable is marginally significant (*P*-value = 0.082) and correctly signed. The results of Equation A show that the trend is significant when LN(SMKT) is excluded, indicating that it is difficult to disentangle the influence of the time and Section 20 market share over our sample period. Equation C in Table 2 corresponds more closely to the model estimated by Gande et al. (1999). They found, however, that the trend variable was insignificant.

[19] The time trend variable was included in our original estimation as well, but it was not significant in any of our estimations.

[20] We test the hypothesis of initial engagement discounting (James, 1992) by examining all issuers with multiple underwritings with the same Section 20 firm. The hypothesis is that Section 20s will charge lower fees for initial underwritings and then increase fees on subsequent issues. We find 26 issuers with multiple issuers with the same commercial bank-affiliated underwriter. The mean gross spread is 0.633% for the initial issues vs. 0.621% for the subsequent issues. The spreads are not significantly different, but appear to decrease slightly with repeat business. Initial engagement discounting does not appear to be a factor accounting for lower Section 20 spreads.

Table 3
Estimation results for gross spread: Extended specification model[a]

Variable	Equation			
	A		B	
	Coeff.	P-value[b]	Coeff.	P-value[b]
CONSTANT	0.916	0.000	0.861	0.000
SECTION	−0.082	0.004		
LN(SMKT)			−0.007	0.893
LN(STAKE)	0.005	0.365	−0.007	0.172
EXCHANGE	−0.008	0.759	−0.006	0.815
LN(FILE)	−0.041	0.001	−0.039	0.001
LN(ISSUE)	0.006	0.559	0.008	0.421
MTN	−0.076	0.027	−0.074	0.032
SHELF	−0.206	0.000	−0.208	0.000
REFINANCE	−0.026	0.277	−0.024	0.302
SENIOR	−0.230	0.006	−0.226	0.007
Aa	0.085	0.416	0.113	0.312
A	0.077	0.455	0.104	0.348
Baa	0.093	0.372	0.117	0.293
Ba	0.892	0.000	0.916	0.000
B	1.919	0.000	1.949	0.000
C	2.026	0.000	2.041	0.000
REP	−0.004	0.001	−0.003	0.011
LN(MAT)	0.180	0.000	0.181	0.000
FRBSHIFT	0.003	0.846	0.000	0.984
Observations	1362		1362	
Adjusted R^2	0.8348		0.8337	

[a] The table gives the OLS estimates for the following equation:

$$\begin{aligned}\text{GROSS SPREAD} = {} & \beta_0 + \beta_1\,\text{SECTION} + \beta_2\,\text{LN(SMKT)} + \beta_3\,\text{LN(STAKE)} \\ & + \beta_4\,\text{EXCHANGE} + \beta_5\,\text{LN(FILE)} + \beta_6\,\text{LN(ISSUE)} + \beta_7\,\text{SHELF} \\ & + \beta_8\,\text{MTN} + \beta_9\,\text{REFINANCE} + \beta_{10}\,\text{SENIOR} \\ & + \beta_{\text{rate}}\,\text{CREDIT RATING} + \beta_{11}\,\text{REP} + \beta_{12}\,\text{LN(MAT)} + \beta_{13}\,\text{FRBSHIFT} \\ & + \beta_{\text{SIC}}\,\text{INDUSTRY}.\end{aligned}$$

GROSS SPREAD is the difference between the offered price and the proceeds to the issuer as a percentage of the issue size. The independent variables are: SECTION is a dummy variable that is 1 if the underwriting book manager is a section 20 underwriter and is 0 otherwise. LN(SMKT) is the natural log of the percentage market share of all Section 20 underwriters in the year of the issue. LN(STAKE) is the natural log of 1 plus STAKE, the lending exposure of the Section 20 subsidiary's affiliated commercial bank to the issuer of the debt claim. EXCHANGE is a dummy variable that is 1 for issuing firms listed on an exchange and 0 otherwise. LN(FILE) is the natural log of the size of the file in millions of dollars. LN(ISSUE) is the natural log of the size of the issue in millions of dollars. MTN is a dummy variable that is 1 if the issue is a medium-term note and 0 otherwise. SHELF is a dummy variable that is 1 if the issue is shelf registered and 0 otherwise. REFINANCE is a dummy variable that is 1 if the purpose of the funding is to repay bank debt and 0 otherwise. SENIOR is a dummy variable that is 1 if the debt is senior and is 0 otherwise. CREDIT RATING is a set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on Moody's credit rating

Table 3 (*continued*)
for the debt issue. For example, A is a dummy variable that is 1 if the Moody's rating for the issue is A1, A2, or A3 and is 0 otherwise. REP is the ratio of total issues ($ yearly) by the underwriter to the total issues ($ yearly) in the sample. LN(MAT) is the natural log of the time (in years) from issue date until maturity. FRBSHIFT is a dummy variable that is 1 if the issue was underwritten after the revenue ceiling increase and 0 otherwise. INDUSTRY is a set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, if SIC2 is 1 for a firm with an SIC code beginning with an SIC code of 2 and is 0 otherwise. *P*-values are presented for significance levels using a two-tailed test.
[b] Newey–West heteroscedastic consistent standard errors were used to calculate *P*-value.

negative and significant impacts on gross spreads. Maturity and reputation continue to be highly significant variables with the hypothesized signs. The credit rating variables again are significant only in the cases of below investment grade credits. Although we suppress reporting the results, the industry identity dummies were significant more often than not.

6.1.3. Investment grade vs. non-investment grade issues

Prior research by Gande et al. (1997, 1999) find that Section 20 firms are especially likely to provide lower-cost underwriting to less creditworthy firms. We analyze this issue by disaggregating the sample into investment and non-investment grade issues. The results of the estimation are given in Table 4. We exclude a number of variables that were highly insignificant in the model reported above, including LN(STAKE), EXCHANGE, and REFINANCE, and likewise here. We find some major differences in the results as they apply to the two types of issues. Section 20 underwriters offer significantly lower underwriting costs for junk bonds, but not in the case of investment grade securities. The market share of all commercial bank-affiliated underwriters does not influence gross spreads in either case, consistent with the results of the aggregated sample. [21] The coefficient of FRBSHIFT is positive and marginally significant in the investment grade equations, suggesting that gross spreads increased on such issues following the Fed's 1997 policy changes.

For investment grade issues, gross spreads decline significantly as file size increases, but increase significantly with issue size. Given the file size, underwriting costs increase with issue size, at least for higher quality issues. Neither file nor issue size has a systematic effect at conventional significance levels

[21] In the year prior to its failure in 1990, Drexel Burnham Lambert's share of the junk bond issues was 38.6%, more than four times that of its nearest competitor. As a referee notes, market shares in underwriting were clearly influenced by Drexel's demise (see Livingston et al., 1995). Since our sample period begins in 1995, we are assuming that the underwriting market has fully adjusted to Drexel's failure over our sample period. The results of Gande et al. (1999) may have been influenced by this event, however, as a referee emphasized.

Table 4
Estimation results for gross spread extended specification model: investment grade vs. non-investment grade underwritings[a]

Variable	Investment grade				Non-investment grade			
	Equation: A		B		C		D	
	Coeff.	*P*-value[b]	Coeff.	*P*-value[b]	Coeff.	*P*-value[b]	Coeff.	*P*-value[b]
CONSTANT	0.096	0.067	0.107	0.146	3.400	0.000	3.796	0.000
SECTION	0.012	0.121			−0.250	0.044		
LN(SMKT)			0.002	0.936			−0.173	0.518
LN(FILE)	−0.013	0.002	−0.013	0.001	−0.103	0.170	−0.124	0.092
LN(ISSUE)	0.015	0.004	0.014	0.005	0.000	0.998	0.032	0.706
MTN	−0.032	0.050	−0.032	0.054	−1.370	0.000	−1.441	0.000
SHELF	0.021	0.055	0.022	0.047	−0.324	0.009	−0.316	0.011
SENIOR					−0.234	0.007	−0.223	0.009
Aa	0.043	0.251	0.040	0.283				
A	0.059	0.104	0.055	0.121				
Baa	0.089	0.014	0.086	0.017				
B					0.901	0.000	0.901	0.000
C					0.850	0.000	0.864	0.004
REP	0.000	0.647	0.000	0.853	−0.017	0.003	−0.011	0.019
LN(MAT)	0.203	0.000	0.203	0.000	−0.204	0.213	−0.246	0.135
FRBSHIFT	0.011	0.093	0.011	0.050	0.091	0.235	0.124	0.158
Observations	1118		1118		244		244	
Adjusted R^2	0.7387		0.7383		0.5977		0.5895	

[a] The table gives the OLS estimates for the following equation:

$$\begin{aligned}\text{GROSS SPREAD} = {} & \beta_0 + \beta_1\,\text{SECTION} + \beta_2\,\text{LN(SMKT)} + \beta_3\,\text{LN(FILE)} + \beta_4\,\text{LN(ISSUE)} \\ & + \beta_5\,\text{SHELF} + \beta_6\,\text{MTN} + \beta_7\,\text{SENIOR} + \beta_{\text{rate}}\,\text{CREDIT RATING} \\ & + \beta_8\,\text{REP} + \beta_9\,\text{LN(MAT)} + \beta_{10}\text{FRBSHIFT} + \beta_{\text{SIC}}\,\text{INDUSTRY}.\end{aligned}$$

GROSS SPREAD is the difference between the offered price and the proceeds to the issuer as a percentage of the issue size. The independent variables are: SECTION is a dummy variable that is 1 if the underwriting book manager is a section 20 underwriter and is 0 otherwise. LN(SMKT) is the natural log of the percentage market share of all Section 20 underwriters in the year of the issue. LN(FILE) is the natural log of the size of the file in millions of dollars. LN(ISSUE) is the natural log of the size of the issue in millions of dollars. MTN is a dummy variable that is 1 if the issue is a medium-term note and 0 otherwise. SHELF is a dummy variable that is 1 if the issue is shelf registered and 0 otherwise. SENIOR is a dummy variable that is 1 if the debt is senior and is 0 otherwise. CREDIT RATING is a set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on Moody's credit rating for the debt issue. For example, A is a dummy variable that is 1 if the Moody's rating for the issue is A1, A2, or A3 and is 0 otherwise. REP is the ratio of total issues ($ yearly) by the underwriter to the total issues ($ yearly) in the sample. LN(MAT) is the natural log of the time (in years) from issue date until maturity. FRBSHIFT is a dummy variable that is 1 if the issue was underwritten after the revenue ceiling increase and 0 otherwise. INDUSTRY is a set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, if SIC2 is 1 for a firm with an SIC code beginning with an SIC code of 2 and is 0 otherwise. *P*-values are presented for significance levels using a two-tailed test.

[b] Newey–West heteroscedastic consistent standard errors were used to calculate *P*-value.

Table 5
Estimation results for yield spread: Parsimonious model[a]

Variable	Equation							
	A		B		C		D	
	Coeff.	P-value[b]	Coeff.	P-value[b]	Coeff.	P-value[b]	Coeff.	P-value[b]
CONSTANT	0.185	0.993	−1.483	0.948	−78.576	0.027	−79.996	0.024
SECTION			2.186	0.691				
LN(SMKT)					33.173	0.022	32.955	0.023
LN(STAKE)	−0.905	0.396	−1.228	0.295	−0.949	0.374		
EXCHANGE	−21.829	0.000	−21.789	0.000	−22.117	0.000	−22.069	0.000
LN(ISSUE)	−1.973	0.126	−1.910	0.140	−2.094	0.103	−1.918	0.125
REFINANCE	−1.003	0.833	−0.991	0.835	−1.746	0.715	−1.899	0.689
SENIOR	47.738	0.012	47.825	0.012	47.874	0.012	48.098	0.011
Aa	15.557	0.023	16.311	0.016	17.133	0.017	16.788	0.021
A	34.544	0.000	35.254	0.000	35.806	0.000	35.508	0.000
Baa	70.464	0.000	71.104	0.000	71.748	0.000	71.321	0.000
Ba	208.368	0.000	209.008	0.000	208.860	0.000	208.773	0.000
B	426.068	0.000	426.847	0.000	426.327	0.000	426.243	0.000
C	514.514	0.000	514.904	0.000	516.488	0.000	517.370	0.000
REP	−0.163	0.495	−0.132	0.611	−0.187	0.434	−0.130	0.572
HIMAT	22.370	0.000	22.428	0.000	22.344	0.000	22.322	0.000
LOWMAT	−16.299	0.000	−16.242	0.000	−16.631	0.000	−16.802	0.000
QUARTER	1.950	0.000	1.934	0.000	0.778	0.239	0.783	0.236
Observations	1362		1362		1362		1362	
Adjusted R^2	0.7487		0.7486		0.7494		0.7495	

[a] The table gives the OLS estimates for the following equation:

$$\begin{aligned}\text{YIELD SPREAD} = {} & \beta_0 + \beta_1\,\text{SECTION} + \beta_2\,\text{LN(SMKT)} + \beta_3\,\text{LN(STAKE)} \\ & + \beta_4\,\text{EXCHANGE} + \beta_5\,\text{LN(ISSUE)} + \beta_6\,\text{REFINANCE} + \beta_7\,\text{SENIOR} \\ & + \beta_{\text{rate}}\,\text{CREDIT RATING} + \beta_8\,\text{REP} + \beta_{\text{MAT}}\,\text{MAT} + \beta_9\,\text{QUARTER} \\ & + \beta_{\text{SIC}}\,\text{INDUSTRY}.\end{aligned}$$

YIELD SPREAD is the yield on the debt being issued less than the yield of a US Treasury of comparable maturity. The independent variables are: SECTION is a dummy variable that is 1 if the underwriting book manager is a section 20 underwriter and is 0 otherwise. LN(SMKT) is the natural log of the percentage market share of all Section 20 underwriters in the year of the issue. LN(STAKE) is the natural log of 1 plus STAKE, the lending exposure of the Section 20 subsidiary's affiliated commercial bank to the issuer of the debt claim. EXCHANGE is a dummy variable that is 1 for issuing firms listed on an exchange and 0 otherwise. LN(ISSUE) is the natural log of the size of the issue in millions of dollars. REFINANCE is a dummy variable that is 1 if the purpose of the funding is to repay bank debt and 0 otherwise. SENIOR is a dummy variable that is 1 if the debt is senior and is 0 otherwise. CREDIT RATING is a set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on the Moody's credit rating for the debt issue. For example, A is a dummy variable that is 1 if the Moody's rating for the issue is A1, A2, or A3 and is 0 otherwise. REP is the ratio of total issues ($ yearly) by the underwriter to the total issues ($ yearly) in the sample. MATURITY is a set of three dummy variables based on the maturity of the issue. HIMAT is 1 if the maturity is greater than 15 years. MIDMAT is 1 if it matures in 5–15 years. LOWMAT is 1 if the maturity is less than 5 years. The dummy variables are 0 otherwise. QUARTER is a quarterly trend variable. For example, QUARTER is equal to 7 if the issue is underwritten in the

Table 5 (*continued*)
third quarter of 1996. INDUSTRY is a set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, if SIC2 is 1 for a firm with an SIC code beginning with an SIC code of 2 and is 0 otherwise. *P*-values are presented for significance levels using a two-tailed test.

[b] Newey–West heteroscedastic consistent standard errors were used to calculate *P*-value.

on gross spreads in the junk bond equations, but the file size is marginally significant with the hypothesized sign in one case. Gross spread is related to maturity in the hypothesized way only for investment grade issues, while senior status has the hypothesized impact on underwriting costs for non-investment grade securities. (All the investment issues have senior status.) Gross underwriter spreads are significantly lower for MTNs in both cases, but the "discount" is substantially larger in the case of junk bonds. Shelf registration increases underwriting fees for investment grade issues, but lowers them significantly for non-investment grade issues. Reputation is relevant only in the case of non-investment grade issues and has the hypothesized impact of reducing underwriting costs.

The overall results are suggestive of striking differences in the factors driving underwriting fees on non-investment grade securities relative to high-quality issues. This may explain why junk bond underwriting has tended to be a somewhat specialized line of business among underwriters historically.

6.2. Yield spread

We follow a similar strategy in examining yield spreads. We begin with the parsimonious model (Table 5) that is similar to Gande et al. (1997, 1999) and then examine a more extensive specification (Table 6).

6.2.1. Parsimonious model

The results in Table 5 for Equation B as reflected in the coefficient of the SECTION dummy reveal no systematic differences in yield spreads between Section 20 and investment bank issues. In Equations C and D, the Section 20 market share variable is significant, but with a positive coefficient, suggesting an anti-competitive effect from Section 20 activity, and conflicting with the findings of Gande et al. (1999). This finding may reflect problems with the specification, however, that we subsequently explore. We find no relationship between yield spreads and a prior commercial banking relationship or with a use of the issue to refinance bank debt. Issue size and reputation are also insignificant variables. The significant variables in these models are the dummy variable reflecting the issuer's status as exchange traded, the seniority dummy, maturity, and the credit rating variables, and all coefficients have the hypothesized signs. The time trend variable is significant, except when the Section

Table 6
Estimation results for yield spread: extended specification model[a]

Variable	Equation					
	A		B		C	
	Coeff.	P-value[b]	Coeff.	P-value[b]	Coeff.	P-value[b]
CONSTANT	10.557	0.711	−3.876	0.893	−84.803	0.020
SECTION	−1.762	0.727	1.663	0.763		
LN(SMKT)					34.603	0.016
LN(STAKE)	−0.815	0.448	−0.769	0.509	−0.563	0.592
EXCHANGE	−17.793	0.002	−21.464	0.000	−21.696	0.000
LN(FILE)	−3.780	0.077	−3.091	0.196	−2.951	0.210
LN(ISSUE)	−2.926	0.135	−3.689	0.099	−3.954	0.076
SHELF	−19.987	0.017	−22.500	0.011	−23.290	0.009
MTN	−17.615	0.001	−9.944	0.103	−10.247	0.091
REFINANCE	−10.736	0.022	−4.019	0.393	−4.823	0.310
SENIOR	51.380	0.004	53.793	0.004	53.940	0.004
Aa	39.789	0.001	27.333	0.000	28.368	0.000
A	61.047	0.000	47.127	0.000	47.900	0.000
Baa	97.304	0.000	79.920	0.000	80.812	0.000
Ba	225.274	0.000	210.899	0.000	210.845	0.000
B	436.067	0.000	419.345	0.000	418.794	0.000
C	517.143	0.000	496.301	0.000	497.740	0.000
REP	−0.645	0.010	−0.097	0.708	−0.145	0.545
LN(MAT)	19.166	0.000	15.435	0.000	15.471	0.000
QUARTER			2.312	0.000	1.102	0.084
ISSQ2	−6.254	0.611				
ISSQ3	−16.980	0.228				
ISSQ4	−19.208	0.110				
ISSQ5	−23.901	0.027				
ISSQ6	−14.100	0.232				
ISSQ7	−26.373	0.039				
ISSQ8	−38.455	0.000				
ISSQ9	−53.510	0.000				
ISSQ10	−34.509	0.001				
ISSQ11	−43.945	0.000				
ISSQ12	−20.846	0.034				
ISSQ13	−11.403	0.247				
ISSQ14	−10.681	0.281				
ISSQ15	10.630	0.350				
ISSQ16	70.044	0.000				
Observations	1362		1362		1362	
Adjusted R^2	0.7927		0.7517		0.7526	

[a] The table gives the OLS estimates for the following equation:

$$\begin{aligned}\text{YIELD SPREAD} = {} & \beta_0 + \beta_1\,\text{SECTION} + \beta_2\,\text{LN(SMKT)} + \beta_3\,\text{LN(STAKE)} + \beta_4\,\text{EXCHANGE} \\ & + \beta_5\,\text{LN(FILE)} + \beta_6\,\text{LN(ISSUE)} + \beta_7\,\text{SHELF} + \beta_8\,\text{MTN} + \beta_9\,\text{REFINANCE} \\ & + \beta_{10}\,\text{SENIOR} + \beta_{\text{rate}}\,\text{CREDIT RATING} + \beta_{11}\,\text{REP} + \beta_{12}\,\text{LN(MAT)} \\ & + \beta_{\text{iss}}\,\text{ISSQ}\ (\beta_{13}\,\text{QUARTER}) + \beta_{\text{SIC}}\,\text{INDUSTRY}.\end{aligned}$$

Table 6 (*continued*)
YIELD SPREAD is the yield on the debt being issued less than the yield of a US Treasury of comparable maturity. The independent variables are: SECTION is a dummy variable that is 1 if the underwriting book manager is a section 20 underwriter and is 0 otherwise. LN(SMKT) is the natural log of the percentage market share of all Section 20 underwriters in the year of the issue. LN(STAKE) is the natural log of 1 plus STAKE, the lending exposure of the Section 20 subsidiary's affiliated commercial bank to the issuer of the debt claim. EXCHANGE is a dummy variable that is 1 for issuing firms listed on an exchange and 0 otherwise. LN(FILE) is the natural log of the size of the file in millions of dollars. LN(ISSUE) is the natural log of the size of the issue in millions of dollars. MTN is a dummy variable that is 1 if the issue is a medium-term note and 0 otherwise. SHELF is a dummy variable that is 1 if the issue is shelf registered and 0 otherwise. REFINANCE is a dummy variable that is 1 if the purpose of the funding is to repay bank debt and 0 otherwise. SENIOR is a dummy variable that is 1 if the debt is senior and is 0 otherwise. CREDIT RATING is a set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on Moody's credit rating for the debt issue. For example, A is a dummy variable that is 1 if the Moody's rating for the issue is A1, A2, or A3 and is 0 otherwise. REP is the ratio of total issues ($ yearly) by the underwriter to the total issues ($ yearly) in the sample. LN(MAT) is the natural log of the time (in years) from issue date until maturity. ISSUE DATE (quarter) is a set of 16 dummy variables (ISSQ1, ..., ISSQ16) based on the quarter of the issue. For example, ISSQ7 is 1 for all issues underwritten in the third quarter of 1996 and is 0 otherwise. QUARTER is a quarterly trend variable. For example, QUARTER is equal to 7 if the issue is underwritten in the third quarter of 1996. INDUSTRY is a set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, if SIC2 is 1 for a firm with an SIC code beginning with an SIC code of 2 and is 0 otherwise. *P*-values are presented for significance levels using a two-tailed test.

[b] Newey–West heteroscedastic consistent standard errors were used to calculate *P*-value.

20 market share variable is included, which hints that the LN(SMKT) variable again may be acting like a trend variable.

6.2.2. Expanded specification

We next estimate the expanded model for yield spread model and the results are reported in Table 6. We estimate the model with the Section 20 dummy using two different methods to address the relevance of time and interest rate cycles over our sample period. The first employs a set of dummy variables reflecting the specific quarter in which the security was issued. The second employs a time trend variable, as did Gande et al. (1999). A disadvantage of using the trend variable is that interest rates cycled over the period, first declining and then rising. In the case of the model (Equation C) containing the aggregate Section 20 market share [LN(SMKT)], we employ only the trend variable, because the nature of the construction of LN(SMKT) is such that it cannot be included in a regression with the individual quarterly dummies since LN(SMKT) is a linear combination of the quarter dummies.

We find that the result of no significant differences between yield spreads according to underwriter type continues to hold, as does the positive impact of Section 20 underwriter market share on yields. A prior commercial banking relationship remains an insignificant factor, as it was in the parsimonious model, but firms that are exchange traded recognize significant yield discounts relative to non-traded issuers. Neither the file nor the issue size are significant variables at conventional levels, but the coefficients are correctly signed.

The credit rating variables are each highly significant and are correctly signed and reveal strong non-linearities in the impact of incremental rating changes. The coefficient of maturity is positive and highly significant in all three models and shelf registration provides substantial and significant yield savings in a similarly robust fashion. The dummy variable seniority is also significant in all specifications, but it is incorrectly signed. This may reflect the fact that only a very small proportion of our sample represents subordinate issues. In a number of instances, the models are sensitive to how we address the influence of time in the regression equations. When we employ quarterly dummy variables to control for market interest rate movements, the coefficient of the MTN dummy and the underwriter reputation variables are significant with the hypothesized sign. The same variables are insignificant when we take account of time with a trend variable. Likewise, the variable reflecting whether the purpose of the loan is to repay bank debt is significant only in the absence of a trend variable and the coefficient is negative. This result provides strong evidence against the "conflict of interest" hypothesis discussed in Puri (1996). We contend that the model that employs the set of time-related dummy variables is the more appropriate specification, since interest rates are clearly cycling over our sample period. The higher R^2 for this model is consistent with this interpretation. We consequently view the results for the LN(SMKT) variable with substantial caution since it may itself be acting as a proxy for time. [22] If one accepts it at face value, however, the result implies that competition from Section 20 firms is no longer driving yields down in the period beyond the Fed's policy shift of early 1997.

6.2.3. Investment grade vs. non-investment grade issues

We next disaggregated the restricted sample by investment grade and non-investment grade issues and estimate the expanded specification. The results are presented in Table 7. We again find different results depending on how we account for time in our estimations. The quarterly dummy approach again yields higher R^2 statistics, particularly in the case of investment grade securities. Section 20 underwriters do not provide yield savings for either type of issue, as was the case for the aggregated model. The Section 20 market share variable is significant and positively signed only for the investment grade issues. The caution about the time trend variable noted above applies here as

[22] If we exclude the trend variable, the coefficient of LN(STAKE) remains positive and significant and its value increases by about 20 basis points.

Table 7
Estimation results for yield spread extended specification model: investment grade vs. non-investment grade underwritings[a]

Variable	Investment grade				Non-investment grade			
	Equation: A		B		C		D	
	Coeff.	P-value[b]	Coeff.	P-value[b]	Coeff.	P-value[b]	Coeff.	P-value[b]
CONSTANT	4.177	0.756	−48.573	0.028	499.953	0.000	312.302	0.122
SECTION	−0.893	0.755			0.368	0.986		
LN(SMKT)			20.079	0.004			59.373	0.388
LN(STAKE)	−0.454	0.458	−0.359	0.565	−7.968	0.251	−5.229	0.450
EXCHANGE	−19.849	0.000	−23.488	0.000	−28.027	0.212	−39.783	0.069
LN(FILE)	−1.550	0.208	−1.622	0.302	−16.745	0.221	−10.284	0.472
LN(ISSUE)	0.030	0.981	−1.073	0.481	−6.857	0.709	−16.254	0.396
SHELF	6.731	0.047	5.478	0.272	−40.130	0.097	−44.966	0.055
MTN	−8.029	0.009	−3.213	0.403	−162.577	0.014	−197.650	0.000
REFINANCE	−6.103	0.007	−1.713	0.479	−20.724	0.205	−25.953	0.114
SENIOR					53.406	0.010	46.992	0.021
Aa	22.495	0.015	16.553	0.128				
A	42.332	0.000	35.312	0.001				
Baa	79.563	0.000	70.170	0.000				
B					186.098	0.000	168.654	0.000
REP	−0.094	0.511	0.253	0.078	−3.624	0.003	−3.096	0.003
LN(MAT)	17.995	0.000	15.073	0.000	−11.036	0.655	10.749	0.762
QUARTER			2.640	0.000			−7.429	0.015
ISSQ2	−0.914	0.821			−0.883	0.983		
ISSQ3	−5.774	0.304			−54.600	0.136		
ISSQ4	−6.676	0.063			−30.849	0.483		
ISSQ5	−2.940	0.449			−79.346	0.019		
ISSQ6	−11.943	0.000			−44.667	0.181		
ISSQ7	−10.717	0.016			−57.496	0.150		
ISSQ8	−21.611	0.000			−98.639	0.004		
ISSQ9	−20.760	0.000			−147.159	0.000		
ISSQ10	−10.841	0.012			−118.515	0.004		
ISSQ11	−17.811	0.000			−166.825	0.000		
ISSQ12	2.700	0.414			−101.776	0.091		
ISSQ13	7.644	0.039			−70.723	0.078		
ISSQ14	15.318	0.000			−87.128	0.008		
ISSQ15	18.681	0.000			136.657	0.272		
ISSQ16	76.381	0.000			240.805	0.002		
Observations	1118		1118		244		244	
Adjusted R^2	0.6256		0.4108		0.5342		0.4507	

[a] The table gives the OLS estimates for the following equation:

$$\begin{aligned}\text{YIELD SPREAD} = {} & \beta_0 + \beta_1\,\text{SECTION} + \beta_2\,\text{LN(SMKT)} + \beta_3\,\text{LN(STAKE)} \\ & + \beta_4\text{EXCHANGE} + \beta_5\,\text{LN(FILE)} + \beta_6\,\text{LN(ISSUE)} + \beta_7\,\text{SHELF} \\ & + \beta_8\,\text{MTN} + \beta_9\,\text{REFINANCE} + \beta_{10}\,\text{SENIOR} + \beta_{\text{rate}}\,\text{CREDIT RATING} \\ & + \beta_{11}\,\text{REP} + \beta_{12}\text{LN(MAT)} + \beta_{\text{iss}}\text{ISSQ}\ (\beta_{12}\,\text{QUARTER}) \\ & + \beta_{\text{SIC}}\,\text{INDUSTRY}.\end{aligned}$$

Table 7 (*continued*)
YIELD SPREAD is the yield on the debt being issued less than the yield of a US Treasury of comparable maturity. The independent variables are: SECTION is a dummy variable that is 1 if the underwriting book manager is a section 20 underwriter and is 0 otherwise. LN(SMKT) is the natural log of the percentage market share of all Section 20 underwriters in the year of the issue. LN(STAKE) is the natural log of 1 plus STAKE, the lending exposure of the Section 20 subsidiary's affiliated commercial bank to the issuer of the debt claim. EXCHANGE is a dummy variable that is 1 for issuing firms listed on an exchange and 0 otherwise. LN(FILE) is the natural log of the size of the file in millions of dollars. LN(ISSUE) is the natural log of the size of the issue in millions of dollars. MTN is a dummy variable that is 1 if the issue is a medium-term note and 0 otherwise. SHELF is a dummy variable that is 1 if the issue is shelf registered and 0 otherwise. REFINANCE is a dummy variable that is 1 if the purpose of the funding is to repay bank debt and 0 otherwise. SENIOR is a dummy variable that is 1 if the debt is senior and is 0 otherwise. CREDIT RATING is a set of seven credit rating dummies (Aaa, Aa, A, Baa, Ba, B, C) based on Moody's credit rating for the debt issue. For example, A is a dummy variable that is 1 if the Moody's rating for the issue is A1, A2, or A3 and is 0 otherwise. REP is the ratio of total issues ($ yearly) by the underwriter to the total issues ($ yearly) in the sample. LN(MAT) is the natural log of the time (in years) from issue date until maturity. ISSUE DATE (quarter) is a set of 16 dummy variables (ISSQ1, ..., ISSQ16) based on the quarter of the issue. For example, ISSQ7 is 1 for all issues underwritten in the third quarter of 1996 and is 0 otherwise. QUARTER is a quarterly trend variable. For example, QUARTER is equal to 7 if the issue is underwritten in the third quarter of 1996. INDUSTRY is a set of eight dummy variables (SIC0, ..., SIC9) based on the primary SIC code of the issuer. For example, if SIC2 is 1 for a firm with an SIC code beginning with an SIC code of 2 and is 0 otherwise. *P*-values are presented for significance levels using a two-tailed test.
[b] Newey–West heteroscedastic consistent standard errors were used to calculate *P*-value.

well, however. The trend coefficient has opposite signs for the two types of issues positive for investment grade and negative for non-investment grade issues.

File and issue size are insignificant variables in every case, as is the measure of the nature and scale of prior bank relationships [LN(STAKE)]. [23] Gande et al. (1997) found that this variable was relevant primarily for junk bond issues. Exchange traded status, maturity, and the dummy reflecting repayment of bank debt as the issue purpose are relevant statistically only for investment grade issues. Shelf registration is a significant variable for both types of issues. However, while shelf registration produces substantial yield savings for junk bond issues, it has a positive impact on yield spreads for investment grade borrowers. This is identical to the result we found for gross spreads.

[23] Throughout the paper we have assumed that the LN(STAKE) is an exogenous variable. If the variable is endogenous, there could be a selection bias problem. Therefore, we test for selection bias. First, we use a probit model with a dependent variable that is 1 if LN(STAKE) is greater than zero and 0 otherwise. Then, we use the residual from the constructed probit model in place of the LN(STAKE) in the OLS analysis. This process was repeated for the gross and yield spread equations. The results, conditioning for the possible selection bias, were quantitatively and qualitatively unchanged. Gande et al. (1997) also found that selection bias was not a problem in their research.

Reputation plays the hypothesized role only for junk bond issues. The only variable that has a significant and systematic effect on yield spreads across issuer type is the MTN dummy. Such issues have lower yields in both cases, although the quantitative effect is substantially smaller in the case of non-investment grade issues. As was the case for gross spreads, we find notable differences in the factors affecting yields for high-grade and low-grade issues.

7. Summary and conclusions

We have examined the fees (gross spreads) and yields associated with debt underwritings by commercial bank-affiliated firms and "traditional" investment banks over the period 1995–1998. Both finance theory and the results of some prior research suggest that underwritings by Section 20 firms might involve lower fees and/or yields for issuing firms. The factors accounting for this are the prospect that, as relatively new entrants into the business, Section 20 underwriters might compete for business by offering "bargain" fees and/or yields, the possibility that commercial bank-affiliated firms might have access to idiosyncratic information not available to traditional investment banks, and the potential for Section 20 firms to exploit distribution channels already established by other affiliates in its holding company. Prior to Q1, 1997, the Federal Reserve attempted to constrain information flows and cross-marketing activities between Section 20 firms and their affiliated banks through the use of firewalls.

We find only limited evidence for the hypothesis that commercial bank-affiliated underwriters perform differently from investment banks over the sample period. Section 20 affiliates do underwrite debt at significantly lower gross spreads, perhaps reflecting some information advantages or a pricing strategy designed to build market share. There are no significant differences in yield spreads between the two types of underwriters, however, even in the case of non-investment grade underwritings. The latter result differs from Gande et al. (1997) and suggests that access to "private" information may not be the primary rationale for the differences in gross spread we observed. If Section 20 underwriters possess superior information sets to investment banks, we would expect yield spreads to be different along with gross spread. In general, our results suggest that commercial bank affiliates underwrite debt in ways quite similar to investment banks over our sample period and that increases in Section 20 market share no longer appear to be yielding the competitive benefits observed by Gande et al. (1999) during an earlier period. [24]

[24] In an earlier version of this paper, we estimated separate models for Section 20 and investment bank underwriters for both gross spreads and yield spreads. We could not reject the hypothesis that the vector of coefficients was identical across underwriter types in all cases. These results are consistent with the view that debt underwriting processes and procedures are convergent in the late 1990s.

Our research did uncover several other findings of interest. First, the process or model that drives junk bond underwriting is substantially different from investment grade underwriting, regardless of underwriter type. Second, MTNs are underwritten with lower gross spreads and lower yield spreads than traditional debt instruments. Contrary to the result of Crabbe and Turner (1995), MTNs are not perfect substitutes for other types of debt. [25] Finally, the size of the file is a more significant factor than issue size as a determination of gross spreads. This suggests that scale economies may be more relevant in the registration phase than in the distribution phase of underwriting.

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[25] Mullineaux et al. (2000) find similar results in a study focused explicitly on the MTN market.

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