DREXEL BURNHAM LAMBERT, UNDERWRITING FEES, AND MARKET POWER

By

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A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2004

This document is dedicated to my parents, Horace and Mildred Williams, and my sons, Benjamin, Daniel and Samuel Williams.

ACKNOWLEDGMENTS

Miles Livingston provided endless encouragement and direction in this endeavor. David Brown, Joel Houston, and Jay Ritter also provided helpful comments and suggestions. My fellow graduate students, especially Stas Nikolova and Rick Borghesi, provided invaluable insight and support. Seminar participants at Florida Atlantic University and the University of Central Florida also added helpful comments.

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August 2004

Chair: Dr. Miles Livingston
Major Department: Finance

I examine the market for new issue bonds from 1977-1999 and show that underwriting fees in the 1980s junk bond market were higher due to the dominant position of Drexel Burnham Lambert. The market for underwriting junk was much more competitive following Drexel's bankruptcy in 1990 and underwriting fees were lower. In contrast to other researchers, I do not find evidence of competitive pressures on underwriting fees from commercial banks entering the new issue junk bond market.

CHAPTER 1
BACKGROUND MATERIAL

Since 1977 we have seen the junk bond market reborn, grow to a multi-billion dollar business, endure scandal and the loss of its dominant underwriter, and finally mature into an accepted method for raising capital. More than a decade has passed since the junk bond market scandals and Drexel Burnham Lambert's filing for bankruptcy in 1989--sufficient time to examine the legacy of the junk bond market and to make judgments about the workings of Michael Milken, Drexel Burnham Lambert and the market for newly issued junk bonds.

There is a wealth of anecdotal evidence stating that the 1980s junk bond market was different (see Stewart (1992), Bruck (1989), and Stein (1992)). Most of this evidence points to the dominance of Michael Milken in creating and then controlling the market. Bruck (1989, page 57) reports the observation of a junk buyer after meeting with Milken in 1979:

> He had the issuers. He had the buyers. He had the most trading capital of any firm. He had the knowhow. He had the best incentive system for his people. He had the history of data--he knew the companies, he knew their trading prices, probably their trading prices going back at least to 1971. He had boxed the compass.

The accusation has also been made that Milken had "captive clients." That is, that he had a set of buyers ready and willing to buy whatever junk issues he made available to them. As Stewart (1992, page 54) reports:

> By early 1977, Milken's operation controlled a remarkable 25% of the market in high-yield securities. It was really the only firm maintaining an active market-making operation with an eye toward enhancing the liquidity of the market.… So Milken became, in effect, the market for high-yield bonds. He had an incredible

> memory, and he knew who owned what issues, what they had paid, their yield to maturity, and who else wanted them. Increasingly, his clients developed such confidence in his research and market acumen that when he urged them to invest in a particular issue, they did.

Almost 30 years after issuing his first junk bond, Michael Milken continues to inspire heated debate and diverging opinions. As the Wall Street Journal editorialized:

> No doubt historians someday will set the record straight on Mr. Milken's contribution to the explosive economic growth experienced by the U.S. in the past 20 years. For now, he remains the most famous figure who became engulfed in the controversial securities prosecutions undertaken by then-U.S. attorney Rudolph Giuliani, based on information supplied by such economically immaterial figures as Ivan Boesky, Dennis Levine and Martin Siegel. ("Yes, Pardon Milken," *Wall Street Journal*, December 13, 2000, page A26.)

This paper is a beginning in setting the record straight, at least in part, by examining the effect Drexel had on the competitive structure of the 1980s junk market and how the market changed in the 1990s. The market for new issue junk is well suited for a study of the relationship between market concentration and competitive behavior because of the exogenous shock in market concentration that occurred when Drexel Burnham Lambert liquidated in 1990. Drexel re-created the new issue junk market in the late 1970s, dominated it for a decade, and then made a sudden, unexpected exit in 1990. This provides the advantage of comparing competition in the same market across time without the confounding influences of other factors that would arise if Drexel's market share had eroded over several years. We examine the effect of this shock on market concentration and underwriting fees.

Our results add to the literature documenting noncompetitive behavior among banks in concentrated markets (see Berger, Demsetz and Strahan (1999) for a summary of this literature). We also add to a growing list of work examining underwriting fees (see Kim, Palia and Saunders (2003), Chen and Ritter (2000), Livingston, Pratt and Mann

(1995)). We continue this strand of literature by offering explanations for the observed decline in underwriting fees for debt issues in the early 1990s and examining how the junk market changed following Drexel's exit.

We see public policy implications in our work as well. Previous research by Gande, Puri and Saunders (1999) suggested that allowing commercial banks into the market for underwriting corporate debt in 1991 resulted in lower underwriting fees. Our results suggest that the role of commercial banks in lowering fees at that time is overstated. We test the hypothesis that improved competition from more firms in general and not simply a different type of firm (in this case, commercial instead of investment banks) is the reason corporate bond underwriting fees are lower in 1991.

We find that Drexel exerted significant market power over the junk market in the 1980s and used this power to charge high underwriting fees. We attribute this to Drexel's ability to signal higher quality through their large position in the aftermarket and their pioneering role in new issue junk. Other underwriters began to match Drexel's fees in the late 1980s and there is evidence of some fee clustering for junk bond issues late in the decade around 3.50 percent. Following Drexel's liquidation in 1990, the leading underwriters could not make the same quality signals as Drexel and were unable to maintain higher fees. Unlike previous researchers, we do not attribute lower fees to commercial bank entry. We find that commercial bank fees are no different than investment bank fees, and the market share of commercial banks is too small prior to 1996 to account for the dramatic drop in fees in the early 1990s.

Literature Review and Development of Testable Hypothesis

To develop our testable hypothesis, we draw upon several strands of literature concerning market structure, competition and innovation. The literature relating to our

paper falls into one of three broad categories: market concentration, junk bonds, and the market for underwriting and selling securities. Among the market concentration literature, we focus on the large amount of research concerning market concentration among banks, particularly as it relates to the interest paid on demand deposits. The work on junk bonds focuses on how junk differs from investment grade bonds and previous studies of issues by Drexel Burnham Lambert. For the underwriting process, most of the work has investigated equity issues, but the results about the competitive nature of that process are easily adapted to our work on debt issues.

Market Concentration

We begin by considering several papers that investigate the relationship between market concentration and the pricing of deposit rates. Gilbert (1984) provides a summary of the early literature covering this topic, while Berger, Demsetz and Strahan (1999) provide a more recent summary article. This research is relevant to our study of the underwriting market because it provides empirical evidence for the relationship between market concentration and prices in financial markets and it discusses the theoretical underpinnings of market concentration and pricing.

Two competing hypotheses are found in the economic literature investigating the relationship between firm profits and market concentration. First, the structure-performance hypothesis states that firms in concentrated markets maximize profits through anti-competitive actions to keep prices high. In this framework, high prices and profits are the result, and not the cause, of market concentration. Note that for this structure to hold there must be some barriers that keep potential competitors out; otherwise the high level of profits will attract new entrants.

The counter-argument to the structure-performance hypothesis is the efficient-structure hypothesis discussed by Demsetz (1973). He points out that market concentration may sometimes be the result of competitive behavior from more efficient firms. For example, consider 2 firms, X and Y, who are making a uniform product. If firm X has lower marginal costs than Y, then X will maximize profits by charging a price lower than Y. In this scenario, the higher market share of X is the result of competitive actions that are beneficial to consumers.

The efficient-structure hypothesis, however, need not always result in lower prices for the consumer. Consider the same firms X and Y, but now suppose they produce a good that has substantial quality differences. In this case, if X has an efficiency advantage by delivering higher quality at the same cost, it may capture market share while charging a price equal to, or even higher than, firm Y.

In summary, both the structure-performance hypothesis and the efficient-structure hypothesis predict that the leaders in market share will enjoy higher profits. While the structure-performance hypothesis predicts higher prices from firms with the highest market share, relative prices in the efficient-structure scenario depend on the quality differences in competing products.

As a test of these competing theories of market concentration, banking research has focused on deposit rates. Deposit rates in the 1980s provided an ideal laboratory to study market concentration and competition because of laws that limited intra-state banking. As Berger and Hannan (1989, page 291) point out, "… the existence of geographically limited markets offers researchers the advantage of comparing profitability and concentration across markets without the confounding influences of interindustry

differences." Since the rate paid to depositors is a homogenous product that cannot be differentiated by quality, the two theories result in different predictions for prices. If the structure-performance hypothesis holds, one would expect to find higher prices (lower deposit rates) in more concentrated markets. In an efficient-structure framework, however, highly concentrated markets are the result of lower prices (higher rates) from the most efficient banks.

Using a sample of deposit rates from 1983-1985, Berger and Hannan (1989) find evidence to support the structure performance hypothesis. They report interest rates paid to depositors in the most concentrated markets were 25 to 100 basis points less than those paid in the least concentrated markets, suggesting that banks have strong market power over depositors. Hannan (1991) finds a similar result in commercial loan rates. Neumark and Sharpe (1992) add to this evidence of noncompetitive pricing by reporting that banks in concentrated markets are slower to raise their deposit interest rates in response to a rise in interest rates. This line of research supports the structure-performance hypothesis for the pricing of loans and deposit rates by banks in concentrated markets.

Underwriting and Selling Securities

Support for the efficient-performance hypothesis among investment banks is provided by Tufano (1989). He studied 58 financial innovations created between 1974 and 1986. Tufano points out that these innovations are expensive to develop, cannot be patented, and are easily imitated by competing investment banks. Yet he finds no evidence that innovating banks profit from higher fees to issue their products. Instead, he finds that innovators actually charge lower fees than imitators, even prior to imitators entering the market. Market share, however, is maintained by the pioneer, with the resulting gain in revenues. Tufano (1989, page 234) reports that

> Syndicates led by pioneers earn average underwriting revenues 2.8 times as large as syndicates led by any other bank in the first year of their new products' lives. Although innovators charge lower prices, they underwrite more deals and capture larger underwriting revenue than imitators.

Based on discussions with investment bankers, Tufano proposes that innovating investment banks gain market share in two ways. First, they use information gained on the early deals to gain a larger share of the secondary market in their new products. Secondly, they signal higher quality by being the innovating bank in a security.

Evidence of noncompetitive behavior in securities markets is provided by Christie and Schultz (1994). They study bid and ask quotes for 100 of the most active stocks in the NASDAQ market in 1991 and find that odd-eighth quotes are virtually nonexistent. They find no evidence that this is due to the negotiation hypothesis of Harris (1991) or to trading volume or other factors that may influence spreads. Interestingly, in a follow-up article Christie, Harris and Schultz (1994) report that NASDAQ dealers suddenly stopped avoiding odd-eighth quotes following publicity of their first article. The results support the claim of implicit collusion among NASDAQ dealers to profit from higher spreads. Dutta and Madhavan (1997) follow this work by presenting a game-theoretic model showing that dealers may behave in a non-cooperative manner and set bid-ask spreads above competitive levels.

Lee, Lochhead, Ritter and Zhao (1996) study the costs of raising capital from 1990 to 1994. They find that underwriting spreads are highest for equity IPOs and lowest for straight debt IPOs, with seasoned equity and convertible debt falling in between. They also report substantial economies of scale, although not as much for debt offerings as equity issues. The credit quality of debt is shown to be a major factor for determining costs, with lower quality debt costing substantially more. The authors note the link

between issue size, credit quality and economies of scale: as the size of the issue increases, all else equal, it will tend to drive down the credit rating and increase the fees, masking some of the economies of scale.

Chen and Ritter (2000) find evidence of implicit collusion among investment bankers in the equity IPO market. Their study examines equity IPOs from 1985 to 1998. For the period from 1995-1998, they find that more than 90 percent of equity IPOs had gross underwriting spreads of exactly 7 percent. The spreads are unrelated to the cost of underwriting, since the spread on the riskiest IPOs are priced the same as easier to value IPOs. Instead of the expected economies of scale, small IPOs spreads are equal to the spread on large IPOs. They offer several explanations for the ability of underwriters to charge higher than competitive spreads, including the importance of analyst coverage, failure of the issuers to focus on costs, and the ease of justifying high spreads by referring to previous deals done at 7 percent.

Junk Bonds

Livingston, Pratt and Mann study debt issues by Drexel Burnham Lambert. They find that Drexel charges higher underwriting fees than other underwriters, but that Drexel bonds have lower yield spreads at issue. The authors calculate the "cost to issue" as the yield to maturity of a bond at issue based on the proceeds from the issue after all fees are paid. On this basis, the cost of having Drexel underwrite the issue is the same as the cost from any other underwriter. Although Drexel gets a higher underwriting fee, they deliver more proceeds.

Jewell and Livingston (1998) study split rated bonds from 1980-1993 and find that yields for split rated bonds are generally the average of the two ratings. Underwriting fees for junk bonds are found to vary substantially by rating, while fees for all investment

grade bonds show little variation across ratings. Neither agency is found to give consistently lower ratings, and they do not find evidence that investors value one rating agency over the other.

Other studies have found that junk bonds have a substantial equity component. Datta, Iskandar-Datta, and Patel (1997) find that junk bond IPOs, like equity IPOs, are underpriced, while investment grade debt IPOs are overpriced. Blume, Keim, and Patel (1991) find that junk bonds have a low correlation with the returns on government securities and a higher correlation with common stocks. Cornell and Green (1991) find that changes in stock prices explain the variance of junk bond returns better than changes in interest rates.

A Summary of Our Findings from Previous Research

1. Rates on deposits and commercial loans in the 1980s provide evidence for the structure-performance hypothesis and non-competitive pricing among banks in concentrated markets.

2. Innovation among investment banks supports the efficient structure hypothesis (Tufano (1989)).

3. The preponderance of gross spreads of exactly 7 percent for equity IPOs from 1995-1998 is evidence of noncompetitive behavior among investment banks (Chen and Ritter (2000)).

4. Junk bonds differ from investment grade bonds in that they are more sensitive to ratings (Jewell and Livingston (1998)) and exhibit a substantial equity component (Fridson (1994)).

Testable Hypothesis

From a theoretical viewpoint, we draw upon the work of Berger and Hannan (1989) and Demsetz (1973) and assert that the concentrated junk market from 1977-1989 should follow either the structure-performance hypothesis or the efficient structure hypothesis. The structure-performance hypothesis would predict that because of the highly

concentrated market, the more efficient firms were able to charge higher prices and glean higher profits. On the other hand, the efficient-structure hypothesis would predict that the most efficient firms cause higher concentration in the market by capturing a higher market share through competitive actions.

Based on the anecdotal evidence, our hypothesis is that the market for underwriting junk from 1977-1989 is a special case of the efficient-structure hypothesis, where the most efficient firm gains market share not by capitalizing on its profitability at lower fees, but by using its quality advantage. Berger and Hannan (1989) point out this special case of the efficient structure hypothesis and note that it does not apply to deposit rates since they do not exhibit differences in quality. According to this hypothesis, Milken was able to signal quality to junk bond issuers and buyers through his position as the innovator and largest dealer in the market, and his history of providing investors superior returns from investments in fallen angels.

If Drexel's dominance of the 1980s junk market is a special case of the efficient-structure hypothesis, we expect Drexel to extract rents for providing the highest quality service. We test this by comparing Drexel's underwriting fees to the fees of all other underwriters in the 1980s junk bond market. We expect the ability to extract rents and higher prices to diminish after Milken and Drexel are out of the market. We test this by comparing the fees of the leading underwriter in the 1990s junk bond market to the fees of all other underwriters.

How other underwriters respond to Drexel's quality advantage is not clear based on the theoretical work to date. On the one hand, if the structure-performance hypothesis holds, we would expect competing underwriters to have difficulty entering the market for

junk. If the structure-performance hypothesis is true, we would expect to find underwriters able to enter the market at lower fees, unless they can signal quality as Drexel does, at which point they can charge higher fees. We document the number and pricing of Drexel's competition from 1977-1989, and test whether Drexel's fees were different than other underwriters' fees through time.

History of the Junk Market: 1977-1990

While a student at Berekely, Michael Milken read "Corporate Bond Quality and Investor Experience, 1900 to 1950" by W. Braddock Hickman. Hickman's study pointed out that a diversified portfolio of non-investment grade bonds outperformed investment grade bonds from 1900-1950. Due to a high number of defaults in the 1930s, the market for new issue high yield bonds was virtually nonexistent between 1940 and 1970. Most high yield bonds prior to 1977 were "fallen angels"--bonds that were issued as investment grade but later downgraded to junk status.

Milken continued his education at Wharton and interned at Drexel Firestone, where he stayed as a full-time employee after completing his MBA. Based on his examination of Hickman's study, Milken realized fallen angels were selling at too large a discount and he profited handsomely by buying them. Over time, he convinced enough investors of the potential profits in junk bonds that he created a liquid market for reselling junk, and later a market for new issue junk bonds. He and his firm, Drexel Burnham Lambert, were highly rewarded for this innovation. In 1975 there were virtually no junk bonds issued, but in 1983 Drexel earned fees on $4.69 billion in new-issue junk bonds.

Drexel dominated the new issue junk market for a decade. In 1983, for example, when Drexel underwrote $4.69 billion in new issue junk, the next closest underwriter was

Salomon Brothers with $445 million. That year, Drexel was the underwriter for 50 out of 79 issues, and 66% of the total par value of bonds brought to market.

Such market dominance led to allegations of price fixing and exorbitant fees on the part of Drexel. It was also alleged that Milken and Drexel maintained "captive" clients for junk issues, buyers who were willing and able to purchase whatever Milken brought to the market, without the usual regard for the financial condition of the issuer.[1] As reported by Berman and Michaels (1992, page 78), Drexel and Milken countered allegations of wrongdoing with claims of serving the capitalistic ideal:

> "… Drexel used financial technology to create value, build businesses and jobs and consumer services by enabling entrepreneurs to raise money far more efficiently than they could have done without us."

In the end, admissions of insider trading and other SEC rules violations led to the much-publicized demise of Drexel in the late 1980s. Milken pleaded guilty to securities fraud and spent time in prison. Drexel filed for bankruptcy in 1990, and the firm was voluntarily liquidated over the next several years.

In addition to the scandals at Drexel, the passage of the Financial Institutions Reform Recovery and Enforcement Act (FIRREA) in 1989 required savings and loans to sell their junk bond holdings. That same year, an academic paper by Asquith, Mullins and Wolff (1989) challenged the traditional view of junk bond default rates. Prior to their work, junk bond default rates were thought to be about 5%. Asquith et al. pointed out that the traditional way of calculating default rates, dividing the number of defaults in a year by the number of junk bonds outstanding, is not an accurate measure of default when the number of issues each year is increasing dramatically. They found that actual defaults

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[1] This accusation forms the basis of Stein's *A License to Steal*.

rates were closer to 30% when considered over the lifetime of the bond. As evidenced by Winkler (1990) their results were noted by practitioners and the popular press.

So in late 1989-early 1990 we have the collapse of Drexel, a re-evaluation of the default rate for junk bonds, and regulation requiring S&Ls to divest of their junk bond holdings. These three events combined to cause enormous downward pressure on prices and a sharp drop in the amount of new issue junk. In 1988 there were $31 billion in new non-convertible junk issues, but in 1990, the year of Drexel's bankruptcy filing, new non-convertible issues of junk bonds had fallen to $1.4 billion. By October of 1990, the spread between junk bonds and 7 year Treasuries reached a record 12%, more than double the average spread in the 1980s.

This change of heart was short-lived, however, and by 1992 junk bonds were back up to almost $40 billion as other underwriters scrambled to fill the vacuum. In spite of the tainted legacy of the 1980s market, the financial community seems to have again embraced the idea of junk bond financing.

Junk Bonds as a Different Market from Investment Grade Issues

One reason we focus on the junk bond market is that the unique nature of the market has been overlooked in previous studies. Although previous studies note differences in underwriter fees due to credit quality, they proceed to make inferences about the entire bond market as a whole. This ignores the fact that the junk and investment grade bond markets are different--they serve different sets of investors with differing investment objectives.

Following the rebirth of junk in the late 1970s, the junk bond market has remained separate from investment grade bonds. One obvious reason is that the lower credit quality of junk bonds attracts different investors than the average investment grade investor. For

instance, many institutional investors, such as pension funds and insurance companies, classify junk bonds as "restricted securities" and are limited in the amount of junk they may own.

Previous research has found that junk bonds behave more like equity than investment-grade bonds. Datta, Iskandar-Datta, and Patel (1997) find that junk IPOs are underpriced, but investment-grade IPOs are overpriced. Blume, Keim, and Patel (1991) and Cornell and Green (1991) document that junk bond prices are more correlated with movements in stock prices than with interest rate changes.

Data

Our empirical sample includes all fixed coupon, non-convertible public debt issues from 1977–1999 for which data is available from the Securities Data Corporation database. We start the sample in 1977 because that is the year Drexel first issued a junk bond, and end the sample in 1999 to avoid any confounding influences in the underwriting market due to the repeal of Glass-Steagall in November 1999. Bonds rated Baa or higher by Moody's are classified as investment grade and bonds with a Moody's rating of Ba or lower are classified as junk. If a bond is not rated by Moody's, but has a Standard and Poor's (S&P) rating, it is assigned the corresponding Moody's rating. Bonds rated as investment by one agency and junk by the other are classified as junk. If the bond is not rated by either agency, it is not included in the sample. Following the previous literature (e.g. Gande et al. (1999)), I eliminate firms in regulated industries (single digit SIC code 4) and financial firms (SIC Code 6). This results in a sample of 4,953 issues, with 3,437 investment grade bonds and 1,516 junk bonds.

Summary Statistics

Summary statistics showing the number of issues, average size, total size, and median underwriter fees for junk bonds are shown in Table 1-1; statistics for the investment-grade sample are shown in Table 1-3. Statistics are shown for all bonds, as well as the most frequent rating in each category (A for investment-grade issues (Table 1-4) and B for junk issues (Table 1-2)). It is easy to see the tremendous growth in junk bonds from these statistics. From 1980 to 1989, the amount of junk principal in our sample increased over 17 times. By contrast, investment grade principal only almost doubled during this time. Also note the tremendous growth in our sample of junk in 1983: from $761 million in issues in 1982 to almost $2 billion in 1983. For the junk market as a whole in 1983, Bleakley (1984) reported that "… Wall Street underwrote more than $7 billion of the low-rated, high-yielding bonds, more than in the previous four years combined."

Underwriter fees are markedly different between the two classes of bonds. Fees for underwriting junk are much higher, with yearly medians ranging from 1.8 percent of principal in 1990 to 3.5 percent of principal in 1987—1989. For investment grade issues, the median underwriter fee ranges from a low of 0.6 percent of principal in 1998 and 1999 to a high of 0.9 percent of principal from 1977-1979. To make a closer determination of this difference, we need to account for factors such as credit quality, time to maturity, and principal amount that have been shown to impact underwriting fees (e.g., Tufano (1989) and Gande et al. (1999)). We run the following regression for our entire sample of junk bonds and also for investment grade bonds:

$$UnderwriterSpread = \alpha_0 + \beta_{cr}\, CreditDummies + \beta_{split}\, SplitDummiess + \beta_2\, Log(Maturity) + \beta_3\, Log(Size) + \beta_4\, Callable + \beta_5\, DebtIPO + \beta_6\, Public + \beta_{ind}\, IndustryDummies + \beta_{year}\, YearDummies \quad (1)$$

The results are reported in Table 1-5 for junk bonds and Table 1-6 for investment-grade bonds. The results show that junk bond underwriter fees are much more sensitive to credit quality, while investment grades issues are more sensitive to time to maturity. All of the rating coefficients for junk are large and significant. Fees for investment issues show only a slight sensitivity in the lowest (Baa) rating, while the coefficients for higher ratings are small and insignificant. Time to maturity is not a significant factor in determining underwriting fees among junk issues, but for investment-grade bonds the coefficient on log(maturity) is relatively large (0.19) and significant. The regression results confirm our assertion that underwriting of junk bonds is priced differently than the underwriting of investment-grade issues.

The changes in the level of underwriting fees is also pertinent to our paper. Since the omitted year dummy is year99, all of the coefficients on the year dummies are relative to the fee level in 1999. For junk bonds, there is a dramatic decline in fees in 1990. The coefficient on year89 is 0.86, while on year90 the fee level is less than half of that (0.46). Note that junk bond fees are uniformly much higher from 1984-1989, with coefficients on the year dummies ranging from 0.56 in 1985 to 0.86 in 1989. In the 1990s, fees for issuing junk are much lower, showing a gradual decline from a coefficient of 0.34 on the year90 dummy to 0.06 on the year98 dummy. A joint test of the coefficients on the year dummies for 1993-1997 indicates that they are not significantly different from each other (F = 0.92, p-value = 0.45). In the junk bond market, we see a sudden drop in underwriting fees in 1990, and fees stay at fairly uniform levels from 1993-1997.

Investment-grade fees show the same decline from 1977-1999, but the differences are much less dramatic than the changes in the junk market. Coefficients on the year dummies in the 1980s range from 0.15 in 1984 to 0.00 in 1983, and then less than 3 basis points difference from 1999 levels is seen from 1991-1998. Fees do not change from 1989 to 1990, and the decline in 1991, while statistically significant at the 10% level, (F=2.77, p-value=0.09) is a drop of only 5 basis points.

Table 1-1. Summary statistics for junk issues. Sample includes all fixed coupon, non-financial, non-regulated bonds issued 1977- 1999 and rated Ba or lower with yield data available from the SDC database.. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Ratings are assigned numerical values as follows: Baa = 4, Ba = 5, B = 6, Caa = 7. Split rated bonds are assigned the average of the two ratings. If the bond is not rated by either agency it is not included in the sample. Total Principal Issued and Mean Size are in millions of dollars. Mean Maturity is in years. Mean and median UW fee are the total underwriting fees for the issue as a percent of total principal issued.

All Junk Issues

Year Issued	Number of Issues	Total Principal Issued	Median Size	Median Maturity	Median Underwriter Fee	Median Rating
1977	11	298	25	15	2.5	5.5
1978	30	785	25	20	3.0	6.0
1979	23	690	25	20	3.3	6.0
1980	18	675	30	20	3.0	6.0
1981	12	770	63	20	2.6	6.0
1982	16	761	43	18	2.8	6.0
1983	25	1,875	60	15	2.6	6.0
1984	34	2,610	54	10	3.3	6.0
1985	63	5,848	50	10	3.0	6.0
1986	113	17,126	100	10	3.4	6.0
1987	80	14,861	125	10	3.5	6.0
1988	65	11,813	140	10	3.5	6.0
1989	55	11,885	169	10	3.5	6.0
1990	4	650	150	8	1.8	5.3
1991	29	7,034	150	10	2.0	5.0
1992	133	21,238	135	10	2.5	6.0
1993	170	29,085	125	10	2.8	6.0
1994	91	15,426	115	10	2.8	6.0
1995	62	11,909	135	10	2.5	5.5
1996	102	18,235	150	10	2.9	6.0
1997	137	25,920	150	10	2.8	6.0
1998	177	35,374	150	10	2.8	6.0
1999	66	15,829	188	10	2.5	6.0
	1516	250,694				

Table 1-2. Summary statistics for B-rated issues. Sample includes all fixed coupon, non-financial, non-regulated bonds issued 1977- 1999 rated B for which yield data is available from the SDC database. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. If the bond is not rated by either agency it is not included in the sample. Total Principal Issued and Mean Size are in millions of dollars. Mean Maturity is in years. Mean and median UW fee are the total underwriting fees for the issue as a percent of total principal issued.

B-Rated Issues

Year Issued	Number of Issues	Total Principal Issued	Median Size	Median Maturity	Median Underwriter Fee
1977	3	95	30	20	3.0
1978	23	583	20	20	3.3
1979	18	487	23	20	3.3
1980	14	475	28	20	3.0
1981	9	510	60	20	2.8
1982	12	491	30	13	2.8
1983	14	690	45	15	3.0
1984	20	1,075	50	15	3.4
1985	40	3,655	50	10	3.2
1986	66	9,301	90	10	3.4
1987	53	10,873	125	10	3.5
1988	48	9,315	150	10	3.5
1989	42	9,779	173	10	3.5
1990	2	350	175	9	3.0
1991	5	735	150	7	3.0
1992	78	12,738	126	10	2.8
1993	113	17,640	125	10	2.8
1994	60	10,052	108	10	2.8
1995	26	3,889	124	10	3.0
1996	61	10,532	150	10	3.0
1997	100	17,835	150	10	3.0
1998	105	16,592	125	10	2.9
1999	35	7,319	150	10	2.8
	947	145,010			

Table 1-3. Summary statistics for investment-grade issues. Sample includes all fixed coupon, non-financial, non-regulated bonds issued 1975-2002 and rated Baa or higher with yield data available from the SDC database. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Ratings are assigned numerical values as follows: Aaa = 1, Aa = 2, A = 3, Baa = 4. Split rated bonds are assigned the average of the two ratings. Total Principal Issued and Mean Size are in millions of dollars. Mean Maturity is in years. Mean and median UW fee are the total underwriting fees for the issue as a percent of total principal issued.

Investment Grade Issues

Year Issued	Number of Issues	Total Principal Issued	Median Size	Median Maturity	Median Underwriter Fee	Median Rating
1977	35	3,801	100	25	0.9	3.0
1978	22	2,615	100	28	0.9	3.0
1979	33	5,285	125	25	0.9	2.5
1980	85	10,993	100	10	0.8	3.0
1981	62	11,555	175	15	0.7	3.0
1982	84	9,362	100	10	0.7	3.0
1983	49	5,070	100	20	0.8	3.0
1984	57	8,635	100	10	0.7	3.0
1985	128	18,089	100	10	0.7	3.0
1986	230	35,374	100	10	0.7	3.0
1987	147	20,725	100	10	0.7	3.0
1988	118	20,403	138	10	0.7	3.0
1989	108	19,189	150	10	0.7	3.0
1990	105	20,444	150	10	0.7	3.0
1991	201	38,723	175	10	0.7	3.0
1992	214	45,088	200	10	0.7	3.0
1993	234	46,294	150	10	0.7	3.0
1994	101	16,146	150	10	0.7	3.5
1995	218	35,045	150	10	0.7	3.3
1996	197	43,113	150	10	0.7	3.3
1997	311	49,041	130	10	0.7	3.0
1998	439	73,654	150	10	0.6	3.0
1999	259	71,371	200	10	0.6	3.5
	3,437	610,014				

Table 1-4. Summary statistics for A-rated issues. Sample includes all fixed coupon, non-financial, non-regulated bonds issued 1975-2002 and rated A with yield data available from the SDC database. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Total Principal Issued and Mean Size are in millions of dollars. Mean Maturity is in years. Mean and median UW fee are the total underwriting fees for the issue as a percent of total principal issued.

	A-Rated Issues				
Year Issued	Number of Issues	Total Principal Issued	Median Size	Median Maturity	Median Underwriter Fee
1977	9	775	75	25	0.9
1978	11	1,245	100	25	0.9
1979	12	1,450	100	25	0.9
1980	45	5,000	100	10	0.7
1981	36	5,950	150	17	0.7
1982	38	3,847	100	10	0.7
1983	15	1,801	100	25	0.7
1984	33	3,495	100	10	0.7
1985	64	8,518	100	10	0.7
1986	91	10,717	100	10	0.7
1987	55	7,858	100	10	0.7
1988	65	11,688	150	10	0.7
1989	44	7,150	125	10	0.7
1990	59	11,325	175	10	0.6
1991	115	20,838	150	10	0.7
1992	87	17,422	200	10	0.7
1993	83	15,294	150	10	0.7
1994	29	4,275	100	10	0.6
1995	78	12,903	125	10	0.7
1996	78	19,769	188	10	0.7
1997	159	23,383	100	10	0.6
1998	202	23,815	54	10	0.6
1999	97	24,232	200	10	0.7
	1,505	242,748			

Table 1-5. OLS regression of underwriting spreads of junk bonds 1977-1999. The sample consists of all bonds issued between January 1, 1977 and December 31, 1999 with yield data available from the SDC database rated as junk by Moody's. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The regression takes the following form:

$$UnderwriterSpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_2 Log(Maturity) + \beta_3 Log(Size)$$
$$+ \beta_4 Callable + \beta_5 DebtIPO + \beta_6 Public + \beta_{ind} IndustryDummies + \beta_{year} YearDummies$$

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables for each Moody credit level. Splits are dummy variables indicating the bond was rated differently by each agency. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. DebtIPO is a dummy variable equal to 1 if the issue was the first debt issue by the firm since 1970, and equals 0 otherwise. Industry Dummies are dummy variables (not reported) for each one-digit SIC code. Year Dummies are dummy variables for each year from 1977-1999. *, **, *** indicate significance at the 10%, 5% and 1% level respectively. The omitted dummies are SplitBaa/Ba and year99

	Junk Issues					
Parameter	Estimate	t-value		Parameter	Estimate	t-value	
Intercept	0.88	5.55	***	year77	0.17	0.98	
split1_2				year78	0.60	5.01	***
dummyAa				year79	0.59	4.57	***
split2_3				year80	0.38	2.74	***
dummyA				year81	0.13	0.80	
split3_4				year82	0.07	0.46	
split2_4				year83	0.35	2.87	***
dummyBaa				year84	0.65	6.03	***
dummyBa	0.97	15.69	***	year85	0.56	6.13	***
split5_6	1.43	20.53	***	year86	0.71	8.99	***
dummyB	1.67	27.96	***	year87	0.84	9.98	***
split6_7	1.78	20.80	***	year88	0.82	9.27	***
dummyC	2.00	14.72	***	year89	0.86	9.39	***
lmat	0.05	1.15		year90	0.34	1.31	
lsize	-0.08	-4.01	***	year91	0.28	2.47	**
callable	0.26	5.78	***	year92	0.07	0.96	
debt_ipo	0.16	5.70	***	year93	0.21	2.86	***
public	-0.04	-1.44		year94	0.26	3.21	***
				year95	0.30	3.37	***
				year96	0.24	3.03	***
				year97	0.17	2.26	**
				year98	0.06	0.82	
Obs:	1,515						
R-Squared	0.65						

Table 1-6. OLS regression of underwriting spreads of investment-grade bonds. The sample consists of all bonds issued between January 1, 1977 and December 31, 1999 with yield data available from the SDC database rated as investment-grade by Moody's. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The regression takes the following form:

$$UnderwriterSpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_2 Log(Maturity) + \beta_3 Log(Size)$$
$$+ \beta_4 Callable + \beta_5 DebtIPO + \beta_6 Public + \beta_{ind} IndustryDummies + \beta_{year} YearDummies$$

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables for each Moody credit level. Splits are dummy variables indicating the bond was rated differently by each agency. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. DebtIPO is a dummy variable equal to 1 if the issue was the first debt issue by the firm since 1970, and equals 0 otherwise. Industry Dummies are dummy variables (not reported) for each one-digit SIC code. Year Dummies are dummy variables for each year from 1977-1999. *, **, *** indicate significance at the 10%, 5% and 1% level respectively. The omitted dummies are AAA and year99

Invesment Issues							
Parameter	Estimate	t-value		Parameter	Estimate	t-value	
Intercept	0.20	5.43	***	year77	0.11	0.98	
split1_2	0.05	1.18		year78	0.07	5.01	***
dummyAa	0.02	0.76		year79	0.07	4.57	***
split2_3	0.00	0.09		year80	0.06	2.74	***
dummyA	0.03	1.12		year81	-0.05	0.80	
split3_4	0.04	1.59		year82	0.02	0.46	
split2_4	0.07	0.61		year83	0.00	2.87	***
dummyBaa	0.08	3.09	***	year84	0.15	6.03	***
dummyBa				year85	0.06	6.13	***
split5_6				year86	0.07	8.99	***
dummyB				year87	0.08	9.98	***
split6_7				year88	0.04	9.27	***
dummyC				year89	0.05	9.39	***
lmat	0.19	37.52	***	year90	0.07	1.31	
lsize	-0.01	-3.01	***	year91	0.02	2.47	**
callable	0.05	4.93	***	year92	0.01	0.96	
debt_ipo	0.02	0.90		year93	0.02	2.86	***
public	-0.02	-1.81	*	year94	0.00	3.21	***
				year95	-0.01	3.37	***
				year96	0.01	3.03	***
				year97	0.00	2.26	**
				year98	0.00	0.82	
Obs:	3,407						
R-Squared	0.43						

CHAPTER 2
UNDERWRITING FEES

To test whether the junk bond market from 1977-1989 follows the structure-performance hypothesis, we first develop a theoretical model of a market dominated by a single underwriter. Based on the results from our model, we empirically examine the fees charged to underwrite junk from 1977-1999. We use linear regressions to control for common factors that affect underwriting fees and treasury spreads to isolate pricing effects specific to the underwriter and the time period.

Theoretical Model

Bruck (1989), Stewart (1992) and Stein (1992) document Milken's dominance in the after-market trading of junk bonds and his superior reputation as an innovator. To see how this would influence underwriting fees, we develop a model where underwriters compete against a single underwriter with a dominant advantage in quality and knowledge of the market. We model Drexel's quality advantage by giving our single underwriter a permanent edge in delivering payoff to the issuers. In our model, other underwriters can approach the quality of the dominant underwriter but never overcome it. We model Drexel's superior knowledge of the market by allowing the single underwriter the right to see the fees of his competitors before announcing his own fee.

Suppose there is a set of underwriters with quality value q, which is public knowledge. q ranges from $[0,1]$. There is a single dominant underwriter whose quality = 1. There are also a number of secondary underwriters, whose quality (q) is a function of the cumulative number of deals (δ) they underwrite as follows:

$$q = 1 - \frac{1}{2+\delta} \tag{2}$$

There are 2 kinds of issuers who will choose an underwriter:

High quality issuers (Q_H): Will only issue through underwriters who are high-quality. A high-quality underwriter is any underwriter who can provide a payoff > ½. A high-quality issuer will choose the lowest fee among available high-quality underwriters.

Low quality issuers (Q_L): Choose the lowest fee, regardless of the payoff.

Let N_H be the number of high-quality issuers and N_L be the number of low quality issuers. Let market is dominated by high quality needs, so that

$$N_H > 2 * N_L \tag{3}$$

Let *f* be the fee charged by the underwriters, and let ν be the number of issues underwritten by an underwriter. The underwriters may choose any fee from $\left[0, \frac{1}{2}\right]$. The payoff for the underwriter is the fee times the number of issues done:

$$\pi_{Underwriter} = f * \nu \tag{4}$$

The payoff for the issuers is the quality received minus the fee paid to the underwriter:

$$\pi_{issuers} = q - f \tag{5}$$

The first mover has the following advantages: (1) the top-underwriter (first mover) earns a **permanent** quality perception of q=1, which is **not** dependent on the number of deals he completes (never changes). (2) The top-underwriter gets to see all other underwriter's fees before setting his own.

The game is played as follows:

1. Quality is revealed.
2. The secondary-underwriters choose their respective fees, f_s.
3. The top-underwriter responds with fee of f_{top}.
4. Issuers choose the best quality/fee combination based on their type.

Now consider the case of underwriters competing against an established first mover who has an unbeatable quality advantage and the right to respond to your fees. For example, assume that the first game is played with the following conditions:

Underwriter	Quality
A	1.00
B	0.50
C	0.50
D	0.50

In choosing their fee, the low-quality underwriters have to consider not only how to maximize profits but their ability to play in the future. If they are undercut on fees, they will underwrite fewer issues and be at a quality disadvantage in the future. They also must consider that the dominant underwriter will respond to their fees and does not have to worry about earning quality through issues.

Note that the top-underwriter, by virtue of permanent higher quality, can **always** undercut the secondary underwriters and capture the entire market. This will also allow him to keep the competition from earning quality through issues. However, since the majority of the market is made up of issuers who need high quality, he can choose not to compete for the low quality issues. He will do this as long as he can capture the high-quality market with a higher fee and earn more than if he captured the entire market with a lower fee. That is, when the following condition is satisfied:

$$f_{top} N_H > f_s (N_H + N_L) \tag{6}$$

meaning

$$f_s < \frac{f_{top} N_H}{(N_H + N_L)} \tag{7}$$

This condition is an upper bound on the fee the secondary underwriters may charge without inviting competition from the top-underwriter. The secondary underwriters also have to worry about being undercut by each other and being at a quality disadvantage in the next game.

In the example game above, the top-underwriter faces no competition for the high-quality market, since even at f_s=0 the secondary underwriters cannot provide a payoff > ½. If the secondary-underwriters charge any positive fee, they risk being undercut by their competitors and being at a quality disadvantage in the future. For the top-underwriter, any fee below 0.50 (say 0.50 – α, where α is a very small positive number) will allow him to capture the entire high-quality market. The resulting equilibrium is:

$$f_{top} = 0.5\text{-}\alpha \qquad \pi_{top} = (0.5\text{-}\alpha) * N_H \tag{8}$$

$$f_s = 0 \qquad \pi_s = 0.00 * N_L = 0 \tag{9}$$

The low-quality market will be split among secondary-underwriters B, C and D, according to

$$v_{S_i} = \frac{N_L}{3} \tag{10}$$

The secondary underwriters will earn zero, but gain quality for the next game. The next game will be played as follows:

Underwriter	Quality
A	1.00
B	$1-\frac{1}{\frac{N_L}{3}}$
C	$1-\frac{1}{\frac{N_L}{3}}$
D	$1-\frac{1}{\frac{N_L}{3}}$

Now the secondary issuers can charge positive fees and still provide quality to the issuers. If they choose a fee so low that the payoff from issuing through them > 0.50, however, they will be invite competition from the top-underwriter in a game they cannot win. The top-underwriter can **always** undercut them and gain the entire market, with the resulting blow to their ability to earn quality for the future. This puts a lower limit on the fee they can charge without inviting competition from the top-underwriter for the low-quality market. Therefore, the secondary underwriters will choose a fee such that

$$q_s - f_s = \frac{1}{2} \tag{11}$$

They cannot charge a lower fee because they cannot compete with the top-underwriter, while they cannot charge a higher fee without risking being undercut by another secondary underwriter.

If there are n secondary underwriters and the game has been played ω times, then

$$f_s = \frac{1}{2} - \frac{1}{\frac{\omega N_L}{n}} \tag{12}$$

Note that as the game continues, $\omega \to \infty$ and $f_s \to \frac{1}{2}$. Of course, at some point f_s becomes large enough that it is worth it for the top-underwriter to lower his fees and capture the entire market (equation 7).

Suppose, however, that there is a penalty for capturing all of the market (anti-trust problems, diseconomies of scale, etc.) Let this penalty be of amount ρ. If this penalty is large enough, the top-underwriter will choose to charge a fee equal to f_s and split the market rather than capture it all. This condition is

$$(f_s - \alpha)(N_H + N_L) - \rho < f_s\left(N_H + \frac{N_L}{n}\right) \tag{13}$$

so

$$\rho > f_s\left(N_L - \frac{N_L}{n}\right) \tag{14}$$

If condition (15) holds, the top-underwriter would rather charge $f_{top} = f_s$ and split the market rather than charge anything lower and capture it all. In this case, once ω is large enough, then $f_{top} = f_s \to \frac{1}{2}$.

Next, consider the case where after a number of games, the dominant underwriter is exogenously removed from the market. Now the secondary underwriters face an entirely different situation: they no longer need worry about being undercut by the top-underwriter, and they can now compete for the N_H issues. If an underwriter chooses a high fee, he can be shut out of the market should the other underwriters charge a lower fee, and be at a quality disadvantage in the next game. The result is that fees are driven to zero.

Our model shows how a single underwriter with a significant edge in quality can charge higher fees while keeping a large market share. Other underwriters will choose to charge fees that do not invite competition from the top-underwriter. As they gain experience in the market and can deliver higher payoffs to issuers, their fees grow to approach those of the top-underwriter. When the top-underwriter is exogenously removed from the market, however, the resulting competitive pressures drive fees much lower.

Empirical Analysis

Our theoretical model suggests that a market dominated by a single underwriter with a distinct quality advantage can maintain high prices even as other underwriters enter the market. Without the dominant player, however, prices will revert to more competitive levels. Using a sample of bonds issued from 1977-1999, we look for evidence of the structure-performance hypothesis by comparing Drexel's underwriting fees to other underwriters from 1977-1989, and comparing the fees from the Drexel period to fees charged after Drexel's demise in 1990.

Figure 2-1 is a graph of the median underwriter fee (as a percent of principal) in the junk and investment market from 1977-2002. The median fee fell dramatically in the junk

market after Drexel's bankruptcy in 1990, from 3.50 percent in 1989 to 2.5 percent in 1992. For investment grade issues, however, the decline in underwriter fees began earlier, falling from 0.9 percent in 1979 to 0.7 percent in 1981. After that, the median fee was 0.7 percent for every year between 1981 and 1997, except for 1983 when it was 0.8 percent.

Data on market concentration for underwriting non-convertible debt during our sample period is presented in Table 2-1 for investment-grade issues and Table 2-2 for junk. Market concentration is as the amount of principal issued by a specific underwriter that year divided by the total amount of principal issued that year. The top underwriter is the underwriter with the highest percentage of principal issued in that year. We also present the concentration of the top two underwriters.

The concentration of the junk market in the 1980s is evident in Table 2-2. From 1980-1989, the top junk underwriter share of principal issued averaged 47 percent and the top two underwriters averaged 61 percent. By contrast, the 1980s investment grade market concentrations averaged 25 percent for the top underwriter and 43 percent for the top two underwriters. From 1990-1999, the averages are virtually the same for the investment market (25 percent for the top underwriter and 41 percent for the top two), while the concentration in the junk market fell dramatically to an average of 25 percent for the top underwriter and 39 percent for the top two. This pattern is seen in the Herfindahl index, also reported in Table 2-1 and Table 2-8. We calculate the Herfindahl index as follows:

$$Herf_{year} = \sum_{1}^{n} MarketConcentration_i^2 \qquad (16)$$

where market concentration is in percent. For investment-grade issues, the average Herfindahl index from 1980-1989 is 1,544. This is virtually unchanged from the 1990-

1999 average of 1,467. For junk issues however, the average Herfindahl index from 1980-1989 is 2,851. This falls to an average of 1,343 for 1990-1999.

Information specific to the junk bond market and the dominance of Drexel is shown in Table 2-3. The results are reported for the junk issues of Drexel versus the issues from all other underwriters. Between 1977 and 1989, Drexel issued 43 percent of the junk bonds and 45 percent of the junk principal in our sample. In 1981 and from 1984-1986, Drexel issued more principal in our sample than all other underwriters combined.

The contrast between the concentration of the 1980s junk market with the 1990s junk market is evident in Table 2-4, which shows the percent of total principal issued by each of the top ten underwriters in each decade. In the 1980s, Drexel issued 45 percent of the total principal in our sample; First Boston, the number two underwriter, issued only 10 percent. For the 1990s, however, the share of principal issued by the top underwriter, Donaldson Lufkin & Jenrette, was only to 18 percent, with the number two underwriter, Merrill Lynch, close behind at 13%.

Interestingly, as other underwriters began to gain market share later in the 1980s, their fees drift toward Drexel's. Drexel's median fee is 3.5 percent in 4 of the 6 years following 1983, the exceptions still being close to 3.5 percent (3.3 percent in 1985 and 3.4 percent in 1986). The non-Drexel median underwriting fee started below this level, at 2.5 percent in 1983, but climbed to match Drexel's fee of 3.5 percent by 1987, and remained at that level in 1988 and 1989. In 1984, 24 percent of junk bonds in our sample paid an underwriter fee of exactly 3.50 percent. This rose to 36 percent in 1987, and by 1989 49 percent of the junk bonds in our sample paid an underwriting fee of exactly 3.50 percent. This pronounced effect is visible in Figure 2-2, which graphs the median fee of

Drexel and non-Drexel bonds during our sample period, and shows how the median non-Drexel fee increased after 1983 until it was equal to the median Drexel fee from 1987-1989.

Other changes during the 1980s do not account for the increase in median fees. Between 1983 and 1989, median issue size increased from $60 million in 1983 to $169 million in 1989. Maturities grew shorter, starting at a median of 15 years to maturity in 1983 and declining to a median maturity of 10 years in 1989. Previous research has documented economies of scale in the underwriting process during this period (see Lee, Lochhead, Ritter and Zhao 1996), so merely increasing the size of issues should not result in higher fees. Shorter maturities tend to lower the risk of the offering, and *ceteris paribus*, should decrease underwriting fees.

The statistics show that Drexel dominated the market for newly issued junk bonds in the 1980s, although their dominance was less in 1989 than it was in 1984. We have also shown that median fees in the 1980s junk market were significantly higher than fees in the 1990s. The upward trend of fees in the second half of 1990 toward a median 3.5 percent, matching the median fee charged by Drexel for most of the decade, follows the pattern suggested by our theoretical model: as other underwriters gained experience in the junk market, they were able to charge fees closer and closer to Drexel's.

Based on these summary statistics, we have reason to believe that the junk bond market in the 1980s was not competitive due to the dominance of a single underwriter and the ability of other underwriters to match Drexel's fees. This non-competitive environment was reversed in the 1990s, as the market became less concentrated following the bankruptcy of Drexel. We test this hypothesis in the next section.

Regression Analysis

Underwriting Fees

We test whether Drexel's high market concentration translated into the power to charge higher fees by running a multivariable regression to control for other influences. Factors such as size, credit rating, and maturity have been shown to impact underwriter fees for newly issued junk bonds. We regress the underwriting fee as a percent of principal on a set of control variables as follows:

$$\begin{aligned} UnderwriterSpread = {} & \alpha_0 + \beta_{cr}\, CreditDummies + \beta_{split}\, SplitDummiess + \beta_1 TopUW + \\ & \beta_2\, Log(Maturity) + \beta_3\, Log(Size) + \beta_4\, Callable + \beta_5\, TopUWIPO + \beta_6\, NonTopIPO + \\ & \beta_7\, Public + \beta_{ind}\, IndustryDummies + \beta_{year}\, YearDummies \end{aligned} \tag{17}$$

where the control variables are defined as follows:

CREDIT:	A dummy variable for each credit rating. For example, DummyB equals 1 if the issue is rated B, and equals 0 otherwise. I omit the AAA dummy in the investment grade sample, so the credit dummy coefficients are relative to a AAA bond.
SPLIT:	A dummy variable indicating that Moody's rating of the issue is not the same as the S&P rating. I omit the Baa/Ba split dummy in the junk bond sample, so the credit dummy coefficients are relative to a Baa/Ba split rated bond.
TopUW:	A dummy variable that equals 1 if the lead underwriter issued more principal in the junk bond market than any other underwriter in that year; equals 0 otherwise.

LMAT:	The natural log of the years to maturity of the issue
LSIZE:	The natural log of the principal amount of the issue
CALLABLE:	A dummy variable that equals 1 if the issue is callable, and equals 0 otherwise.
TopUWIPO	A dummy variable that equals 1 if the issue is the first debt issue by the issuer since 1970 and is issued by the top-uw; equals 0 otherwise.
NonTopUWIPO	A dummy variable that equals 1 if the issue is the first debt issue by the issuer since 1970 and is issued by a nontop-uw; equals 0 otherwise.
Public	A dummy variable equal to 1 if the issuer was listed on an exchange in the year of the debt issue; equals 0 otherwise.
INDUSTRY:	A dummy variable for each single-digit SIC code. For example, SIC3 equals 1 if the issuer has a single-digit SIC code of 3, equals 0 otherwise.
YEAR:	A dummy variable for each year except one. For example, Dummy80 equals 1 if the bond was issued between January 1, 1980 and December 31, 1980, and equals 0 otherwise.

Our hypothesis is that Drexel was able to maintain a high level of underwriting fees due its position as the dominant underwriter, and that fees in the post-Drexel junk bond market were lower. To measure the effect of Drexel in the 1980s junk market, we run this regression for junk bonds issued from 1977-1989 and compare the results to junk bonds issued from 1990-1999. The results are reported in Table 2-5. The coefficients for each

decade are fairly similar, except for the coefficient on TOPUW and TopUWIPO. In the 1977-1989 regression, TOPUW is positive and significant (0.25, t=4.12), indicating that Drexel's fees were higher by 25 basis points. This type of market power disappeared in the 1990s, however, as the coefficient on TOPUW is small and insignificant.

Interestingly, all categories of underwriters charge extra fees (from 13-20 basis points) for issuing debt-ipos except for Drexel. TopUWIPO is positive and significant only in the 1990-1999 sample, and NontopIPO is positive and significant in both samples. We see this as further evidence of Drexel's superior knowledge of the junk-bond market. With his legendary work in researching and following both existing and potential junk issuers, Milken may not have faced the information asymmetry problems other underwriters did with debt-ipos.

To test our claim that other underwriters began to match Drexel's fees in the late 1980s, we run the following regression:

$$\begin{aligned} UnderwriterSpread &= \alpha_0 + \beta_{cr}\, CreditDummies + \beta_{split}\, SplitDummiess + \beta_2\, NonTopUW \\ &+ \beta_3\, Log(Maturity) + \beta_4\, Log(Size) + \beta_4\, DebtIPO + \beta_5\, Callable + \beta_6\, Putable + \\ &\beta_{ind}\, IndustryDummies + \beta_{NTYearr}\, NonTopYear + \beta_{year}\, YearDummies \end{aligned} \tag{18}$$

where we introduce new control variables as follows:

NonTopUW:	Dummy variable equal to 1 if the issuer is not the top underwriter in that year; equal to 0 otherwise.
NonTopYear:	The interaction between NonTop and Year dummies. For example, NonTopYear83 equals 1 if the bond was issued in 1983 and issued by a NonTop underwriter; equals 0 otherwise.

The regression is designed so that the difference between the level of fees of top underwriters and non-top underwriters for each year will be the sum of the NonTopUW and NonTopYear coefficients. To see why this is so, note that for top underwriters, equation 2 becomes:

$$\begin{aligned} TopUnderwriterSpread &= \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_3 Log(Maturity) + \\ &\beta_4 Log(Size) + \beta_4 DebtIPO + \beta_5 Callable + \beta_6 Putable + \beta_{ind} IndustryDummies + \beta_{year} YearDummies \end{aligned} \quad (19)$$

since the NonTopUW and NonTopYear dummies are zero. For NonTop underwriters, all of the terms from (18) remain. So to compare two issues that are alike in every way except that one is issued by a top underwriter and the other is not, we subtract (19) from (18):

$$\begin{aligned} &NonTopUnderwriterSpread - TopUnderwriterSpread = \\ &\beta_2 NonTopUW + \beta_{NTYear} NonTopYear \end{aligned} \quad (20)$$

The results, reported in Table 2-6, confirm our assertion that fees charged by other underwriters grew closer to Drexel's fees over time. Fees prior to 1984 are different only in 1980, but after 1983, the first year of a decade of tremendous growth in the junk bond market, Drexel's fees are higher in every year except 1988. The value of NonTopUW + NonTopYear is negative and significant from 1984-1987. In 1986, however, the difference has narrowed to a little more than half of what it was in 1984. By 1988 the difference is not significant. As the market began to expand in 1983, Drexel's fees were initially higher than those of other underwriters, but the difference grew smaller over time and virtually disappeared by 1988.

Evidence from our regressions confirms that underwriter fees were higher in the 1980s then the 1990s. Drexel was able to charge fees higher than other underwriters during the 1980s, but the dominant underwriters in the 1990s were not able to duplicate

Drexel's pricing power (see Table 2-5). As they gained experience, other underwriters began to match Drexel's fees in the late 1980s (see Table 2-6). After the collapse of the junk bond market in 1990, however, the market for underwriting junk bonds became much less concentrated and not dominated by a single underwriter (see Table 2-4). As a result, fees fell significantly in 1992 and have remained lower throughout the 1990s.

Treasury Spreads

Our hypothesis is that Drexel was able to maintain higher fees because of their inherent quality advantage. We look for the source of this advantage by drawing upon the results of Livingston, Pratt and Mann (1995). In their sample of 2,725 bonds, including 404 junk bonds, and document that treasury spreads for Drexel issues were lower than non-Drexel bonds.

The fees paid to the underwriter are just one component of the cost of issuing debt. The yield require to sell the bonds at a given price is the major cost to the issuer. If an underwriter is able to sell your bonds at a lower yield, that is worth a substantial amount in additional fees to the underwriter. For instance, suppose you have to chose between two underwriters, A and B with different fee/yield options. Underwriter A can sell the bonds for par with a yield of 8 percent, underwriter B can sell the bonds at par with a yield of 7.75 percent. If we assume a $10 million issue with 10 years to maturity and a cost of capital of 10 percent, the savings of 25 basis points in yield has a present value of just over $150,000. So the firm would be willing to pay an additional 150 basis points in fees to underwriter B to save the 25 basis points in yield.

To test the power of the top-underwriter in determining treasury spreads in the 1980s vs. the 1990s, we substitute Treasury spread of the issue (in basis points) for the underwriting spread in regressions (16) and (17) again on our sample of junk bonds. The

results from regression (16) are presented in Table 2-7 and regression (17) in Table 2-8. We do not see a significant ability for Drexel to sell bonds at lower spreads than other underwriters in the 1977-1989 sample. The TopUW coefficient in Table 2-7 is a negative 16.50 basis points, but is not significant (t=1.60). Curiously, the top-underwriter in the 1990-1999 sample has treasury spreads almost 30 basis points higher than other underwriters. The results may suggest that the hardest to sell issues seek out the top-underwriter, and that Drexel was able to sell those better than top-underwriters in the 1990s. Since our regressions control for factors commonly associated with the inherent risk of bonds (credit ratings, issue size, and time to maturity), it is unclear what other factors could produce this result.

The year by year differences in treasury spreads between Drexel and all other underwriters shown in Table 2-8 show marginal support for Drexel's ability to sell at higher prices. The difference in spreads is large and significant in 1981 (108 basis points), 1983 (63 basis points) and 1986 (29 basis points). The differences in all other years from 1977-1989 are not different from zero. Although these results do not make a strong case for Drexel's ability to get higher prices for junk bonds issues, we do find that Drexel's treasury spreads are lower in 3 of the years and are never higher than other underwriters.

Table 2-1. Market share of investment-grade underwriters 1977-1999. Sample includes all fixed coupon, non-financial, non-regulated bonds issued 1977- 1999 and rated Baa or higher with yield data available from the SDC database. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. If the bond is not rated by either agency it is not included in the sample. Top Underwriter is the underwriter who issued the most principal that year. Shares are percent of principal issued. The Herf index is calculated as the sum of all market shares (in percent) squared.

	Top Underwriter	Percent Share of Top Underwriter	Percent Share of Top 2 Underwriters	Herf Index
1977	Morgan Stanley	20	39	1,194
1978	Goldman Sachs	28	43	1,465
1979	Salomon Brothers	28	53	1,852
1980	Morgan Stanley	18	33	1,105
1981	Morgan Stanley	31	52	1,842
1982	Goldman Sachs	26	43	1,447
1983	Goldman Sachs	21	39	1,299
1984	Salomon Brothers	45	58	2,516
1985	Salomon Brothers	34	55	1,929
1986	Goldman Sachs	21	39	1,346
1987	Salomon Brothers	18	36	1,399
1988	Morgan Stanley	17	32	1,222
1989	Salomon Brothers	23	41	1,452
1990	Goldman Sachs	25	42	1,607
1991	Goldman Sachs	26	43	1,515
1992	Goldman Sachs	27	43	1,560
1993	Goldman Sachs	26	41	1,423
1994	Goldman Sachs	27	42	1,592
1995	Goldman Sachs	26	46	1,486
1996	Goldman Sachs	34	47	1,714
1997	Goldman Sachs	19	36	1,200
1998	Morgan Stanley Dean Witter	18	36	1,289
1999	Goldman Sachs	21	36	1,279

Table 2-2. Market share of junk underwriters 1977-1999. Sample includes all fixed coupon, non-financial, non-regulated bonds issued 1977- 1999 and rated Ba or lower with yield data available from the SDC database. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. If the bond is not rated by either agency it is not included in the sample. Top Underwriter is the underwriter who issued the most principal that year. Shares are percent of principal issued. The Herf index is calculated as the sum of all market shares (in percent) squared.

	Top Underwriter	Percent Share of Top Underwriter	Percent Share of Top 2 Underwriters	Herf
1977	Drexel, Burnham, Lambert	35	64	2,468
1978	Drexel, Burnham, Lambert	41	53	2,099
1979	Drexel, Burnham, Lambert	34	46	1,763
1980	Drexel, Burnham, Lambert	42	56	2,309
1981	Drexel, Burnham, Lambert	62	62	4,131
1982	Merrill Lynch	57	84	4,102
1983	Drexel, Burnham, Lambert	41	63	2,444
1984	Drexel, Burnham, Lambert	70	76	4,970
1985	Drexel, Burnham, Lambert	57	70	3,563
1986	Drexel, Burnham, Lambert	53	60	3,032
1987	Drexel, Burnham, Lambert	39	55	2,180
1988	Drexel, Burnham, Lambert	41	55	2,197
1989	Drexel, Burnham, Lambert	34	49	1,808
1990	Goldman Sachs	38	38	2,426
1991	Merrill Lynch	44	61	2,439
1992	Goldman Sachs	19	30	1,006
1993	Merrill Lynch	22	37	1,087
1994	Donaldson Lufkin & Jenrette	21	35	1,028
1995	Donaldson Lufkin & Jenrette	21	37	1,044
1996	Donaldson Lufkin & Jenrette	17	32	821
1997	Donaldson Lufkin & Jenrette	18	35	894
1998	Donaldson Lufkin & Jenrette	20	31	973
1999	Donaldson Lufkin & Jenrette	35	50	1,712

Table 2-3. Summary statistics for the junk bond market from 1977-1989. The sample includes all non-convertible, non-financial, non-regulated fixed-coupon bonds rated as junk with yield data available from the SDC database. The top panel reports bonds whose lead underwriter was Drexel Burnham Lambert; the bottom panel reports bonds whose lead underwriter was not Drexel Burnham Lambert. Total Principal Issued, Mean Size and Total Underwriting Fees are in millions of dollars. Mean Maturity is in years. Median and Mean UW Fee is the total underwriting fees for the issue in percent of total principal issued. IPO indicates the issue was the first debt issue by the company since 1970. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Ratings are assigned numerical values as follows: Baa = 4, Ba = 5, B = 6, Caa = 7. Split rated bonds are assigned the average of the two ratings. If the bond is not rated by either agency it is not included in the sample.

Drexel Issues

	Number of Issues	Total Principal Issued	Median Size	Median Maturity	Median Rating	Number of IPOs	Median Underwriter Fee	Total Underwriting Fees
1977	5	105	20	15	5.5	4	3.0	3
1978	11	325	20	18	6.0	8	3.3	10
1979	8	238	23	19	6.0	4	3.3	7
1980	7	285	30	17	6.0	6	3.3	9
1981	8	480	63	20	6.0	3	2.7	12
1982	8	205	20	7	6.0	2	2.7	6
1983	13	770	60	15	6.0	9	3.0	24
1984	19	1,825	80	10	6.0	10	3.5	61
1985	31	3,358	70	12	6.0	11	3.3	108
1986	47	9,075	90	10	6.0	22	3.4	310
1987	30	5,863	100	10	6.0	11	3.5	203
1988	31	4,883	105	10	6.0	14	3.5	164
1989	17	4,016	151	10	6.0	10	3.5	138
	235	31,426				114		1,054

Non-Drexel Issues

	Number of Issues	Total Principal Issued	Median Size	Median Maturity	Median Rating	Number of IPOs	Median Underwriter Fee	Total Underwriting Fees
1977	6	193	30	18	5.5	2	2.4	4
1978	19	460	25	20	6.0	14	3.0	14
1979	15	452	25	20	6.0	9	3.0	13
1980	11	390	30	20	6.0	4	3.0	11
1981	4	290	80	20	5.5	3	2.4	7
1982	8	556	58	20	6.0	4	2.9	16
1983	12	1,105	83	20	5.3	3	2.5	27
1984	15	785	35	15	6.0	8	3.0	21
1985	32	2,490	50	10	6.0	20	2.8	66
1986	66	8,051	100	10	6.0	41	3.3	233
1987	50	8,998	125	10	6.0	28	3.5	289
1988	34	6,930	155	10	6.0	19	3.5	234
1989	38	7,869	173	10	6.0	16	3.5	257
	310	38,570				171		1,190

Table 2-4. Percent of total junk principal issued by the top 10 underwriters. The sample consists of all unregulated, non-financial, fixed-coupon bonds issued from 1980-1999 rated as junk by Moodys or Standard and Poor's with yield data available in SDC. Panel A reports junk issues from 1980-1989, Panel B reports issues from 1990-1999.

1977-1990		1990-1999	
Underwriter	Percent of principal issued	Underwriter	Percent of principal issued
Drexel, Burnham, Lambert	45	Donaldson Lufkin & Jenrette	18
First Boston Corp	10	Merrill Lynch & Co	13
Morgan Stanley	8	Goldman Sachs & Co	8
Goldman Sachs & Co	7	Lehman Brothers	6
Merrill Lynch Capital Markets	7	Chase Securities	6
Salomon Brothers	6	Morgan Stanley & Co	5
Bear Stearns & Co	3	Salomon Brothers	5
Kidder Peabody & Co	2	Bear Stearns & Co	4
Shearson Lehman Brothers	2	BT Securities Corp	4
Merrill Lynch & Co Inc	2	CS First Boston Corp	4

Table 2-5. OLS regression of underwriting spreads for junk bonds. The sample consists of all bonds issued between January 1, 1977 and December 31, 1999 with yield data available from the SDC database and rated Ba or lower by Moody's. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The regression takes the following form:

$$UnderwriterSpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_1 TopUW + \beta_2 Log(Maturity) + \beta_3 Log(Size)$$
$$+ \beta_4 Callable + \beta_5 TopUWIPO + \beta_6 NonTopIPO + \beta_7 Public + \beta_{ind} IndustryDummies + \beta_{year} YearDummies$$

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables for each Moody credit level. Splits are dummy variables indicating the bond was rated differently by each agency. For the 1977-1989 sample, TopUW is a variable that equals 1 if the lead underwriter of the issue was Drexel Burnham Lambert, and equals 0 otherwise. For the 1990-1999 sample, TopUW is a variable that equals 1 if the lead underwriter of the issue issued more principal in the junk bond market than any other underwriter in that year; it equals 0 otherwise. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. TopIPO and NonTopIPO are dummy variables that equal 1 if the lead underwriter of the issue was a Top (NonTop) underwriter in the year of the issue, and equals 0 otherwise. Public is a dummy variable that equals 1 if the issuer's equity was listed on an exchange in the year of the issue, and equals 0 otherwise. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. Industry Dummies are dummy variables (not reported) for each one-digit SIC code. Year Dummies (not reported) are dummy variables for each year from 1977-1999. *, **, *** indicate significance at the 10%, 5% and 1% level respectively. The omitted dummies are SplitBaa/Ba, year89 and year99.

	1977 - 1989			1990-1999		
Parameter	Estimate	t-value		Estimate	t-value	
Intercept	2.11	8.35	***	0.56	2.79	***
dummyC	1.76	9.04	***	2.00	9.19	***
dummyB	1.43	10.88	***	1.70	25.03	***
dummyBa	0.74	5.21	***	1.02	14.76	***
split5_6	1.05	7.27	***	1.52	18.59	***
split6_7	1.49	10.08	***	1.86	14.43	***
lmat	-0.04	-0.59		0.16	2.53	**
lsize	-0.10	-3.47	***	-0.07	-2.49	**
callable	0.41	3.25	***	0.22	4.57	***
top_uw	0.25	4.12	***	-0.01	-0.17	
nontop_ipo	0.13	2.26	**	0.19	5.05	***
topuw_ipo	0.06	0.97		0.20	2.40	**
public	-0.05	-1.05		-0.04	-1.10	
Obs:	545			967		
R-Squared	0.49			0.61		

Table 2-6. OLS regression to determine difference between underwriter spread of the top underwriter and those of all other underwriters 1977-1989. The sample consists of all bonds issued between January 1, 1977 and December 31, 1989 and rated Ba or lower by Moody's. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The regression takes the following form:

$$UnderwriterSpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_2 NonTopUW + \beta_3 Log(Maturity) + \beta_4 Log(Size) + \beta_4 DebtIPO$$
$$+ \beta_5 Callable + \beta_6 Putable + \beta_{ind} IndustryDummies + \beta_{NTYearr} NonTopYear + \beta_{year} YearDummies$$

1977-1989

Parameter	Estimate	t-value		Parameter	Estimate	t-value		Parameter	Estimate	p-value	
Intercept	2.63	9.61	***								
dummyC	1.72	8.94	***								
dummyB	1.41	10.89	***								
dummyBa	0.68	4.84	***								
split5_6	1.02	7.12	***								
split6_7	1.46	9.96	***								
lmat	-0.07	-1.11									
lsize	-0.13	-4.37	***								
callable	0.42	3.38	***								
nontop	-0.27	-1.99	**								
debt_ipo	0.09	1.99	**								
public	-0.07	-1.35									
nondrex77	-0.01	-0.04		year77	-0.69	-2.77	***	NonTop+NonTopyear77	-0.28	0.31	
nondrex78	0.48	2.16	**	year78	-0.61	-3.17	***	NonTop+NonTopyear78	0.21	0.23	
nondrex79	0.30	1.22		year79	-0.48	-2.25	**	NonTop+NonTopyear79	0.03	0.89	
nondrex80	0.04	0.17		year80	-0.51	-2.34	**	NonTop+NonTopyear80	-0.23	0.31	
nondrex81	0.46	1.47		year81	-0.95	-4.56	***	NonTop+NonTopyear81	0.19	0.50	
nondrex82	0.86	3.07	***	year82	-1.26	-5.94	***	NonTop+NonTopyear82	0.59	0.02	**
nondrex83	0.27	1.15		year83	-0.64	-3.54	***	NonTop+NonTopyear83	0.00	1.00	
nondrex84	-0.30	-1.44		year84	-0.15	-0.94		NonTop+NonTopyear84	-0.57	0.00	***
nondrex85	-0.21	-1.17		year85	-0.24	-1.62		NonTop+NonTopyear85	-0.48	0.00	***
nondrex86	-0.06	-0.37		year86	-0.10	-0.78		NonTop+NonTopyear86	-0.33	0.00	***
nondrex87	-0.05	-0.27		year87	0.02	0.13		NonTop+NonTopyear87	-0.32	0.00	***
nondrex88	0.24	1.34		year88	-0.21	-1.51		NonTop+NonTopyear88	-0.03	0.79	
Obs:	545										
R-Squared:	0.53										

Table 2-6. Continued

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables (not reported) for each Moody credit level. Splits are dummy variables (not reported) indicating the bond was rated differently by each agency. NonTopUW is a dummy variable indicating that the lead underwriter of the issue is not the issuer of the largest amount of principal in the market for that year. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. DebtIPO is a dummy variable equals 1 if the issue was the first debt issue by the company since 1970; equals 0 otherwise. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. Putable is a dummy variable equals 1 is the bond issued is putable, equals 0 otherwise. Industry Dummies are dummy variables (not reported) for each one-digit SIC code. NonTopYear is the product of the NonTop dummy variable and the Year dummy. Year Dummies are dummy variable for each year from 1977-1989. For example, dummy77 equals 1 if the bond was issued in 1977; equals 0 otherwise. The value of NonTop+Year equals the distance between the UW fee of the top underwriter and all others. p-values are based on an F-test of NonTop+NonTopYear equals 0. *, **, *** indicate significance at the 10%, 5% and 1% level respectively.

Table 2-7. OLS regression of treasury spreads for junk bonds. The sample consists of all bonds issued between January 1, 1977 and December 31, 1999 with yield data available from the SDC database and rated Ba or lower by Moody's. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The regression takes the following form:

$$TreasurySpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_1 TopUW + \beta_2 Log(Maturity) + \beta_3 Log(Size)$$
$$+ \beta_4 Callable + \beta_5 TopUWIPO + \beta_6 NonTopIPO + \beta_7 Public + \beta_{ind} IndustryDummies + \beta_{year} YearDummies$$

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables for each Moody credit level. Splits are dummy variables indicating the bond was rated differently by each agency. For the 1977-1989 sample, TopUW is a variable that equals 1 if the lead underwriter of the issue was Drexel Burnham Lambert, and equals 0 otherwise. For the 1990-1999 sample, TopUW is a variable that equals 1 if the lead underwriter of the issue issued more principal in the junk bond market than any other underwriter in that year; it equals 0 otherwise. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. TopIPO and NonTopIPO are dummy variables that equal 1 if the lead underwriter of the issue was a Top (NonTop) underwriter in the year of the issue, and equals 0 otherwise. Public is a dummy variable that equals 1 if the issuer's equity was listed on an exchange in the year of the issue, and equals 0 otherwise. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. Industry Dummies are dummy variables (not reported) for each one-digit SIC code. Year Dummies (not reported) are dummy variables for each year from 1977-1999. *, **, *** indicate significance at the 10%, 5% and 1% level respectively. The omitted dummies are SplitBaa/Ba, year89 and year99.

	1977 - 1989			1990-1999		
Parameter	Estimate	t-value		Estimate	t-value	
Intercept	336.05	7.84	***	417.73	10.15	***
dummyC	213.54	6.39	***	355.25	8.34	***
dummyB	184.90	8.27	***	242.75	17.87	***
dummyBa	80.41	3.32	***	95.88	7.00	***
split5_6	120.57	4.91	***	144.36	8.91	***
split6_7	205.02	8.14	***	352.31	13.05	***
top_uw	-16.50	-1.60		28.98	2.46	**
nontop_ipo	1.82	0.19		38.76	4.93	***
topuw_ipo	20.14	1.85	*	17.01	1.02	
lmat	25.22	2.37	**	-40.25	-3.07	***
lsize	-7.95	-1.61		-19.95	-3.65	***
callable	-8.45	-0.41		47.65	4.65	***
public	-21.02	-2.55	**	-18.19	-2.38	**
Obs:	524			901		
R-Squared:	0.61			0.58		

Table 2-8. OLS regression to determine difference between treasury spreads of the top underwriter and those of all other underwriters 1977-1989. The sample consists of all bonds issued between January 1, 1977 and December 31, 1989 and rated Ba or lower by Moody's. Bonds not rated by Moody's but rated by S&P are assigned the corresponding Moody's rating. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The regression takes the following form:

$$TreasurySpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_{split} SplitDummiess + \beta_2 NonTopUW + \beta_3 Log(Maturity) + \beta_4 Log(Size) + \beta_4 DebtIPO$$
$$+ \beta_5 Callable + \beta_6 Putable + \beta_{ind} IndustryDummies + \beta_{NTYearr} NonTopYear + \beta_{year} YearDummies$$

1977-1989

Parameter	Estimate	t-value		Parameter	Estimate	t-value		Parameter	Estimate	p-value	
Intercept	358.70	7.66	***								
dummyC	223.91	6.64	***								
dummyB	189.36	8.40	***								
dummyBa	78.52	3.20	***								
split5_6	119.70	4.84	***								
split6_7	204.08	8.01	***								
lmat	20.36	1.85	*								
lsize	-7.88	-1.57									
callable	-8.32	-0.40									
nontop	-31.78	-1.36									
debt_ipo	7.26	0.95									
public	-21.75	-2.63	***								
nondrex77	-7.26	-0.14		year77	-184.73	-4.44	***	NonTop+NonTopyear77	-39.04	0.41	
nondrex78	17.62	0.44		year78	-228.33	-6.86	***	NonTop+NonTopyear78	-14.17	0.66	
nondrex79	11.15	0.23		year79	-217.92	-5.24	***	NonTop+NonTopyear79	-20.63	0.62	
nondrex80	7.90	0.18		year80	-92.38	-2.52	**	NonTop+NonTopyear80	-23.88	0.53	
nondrex81	139.92	2.63	***	year81	-129.34	-3.70	***	NonTop+NonTopyear81	108.14	0.02	**
nondrex82	83.37	1.76	*	year82	-91.56	-2.56	**	NonTop+NonTopyear82	51.59	0.21	
nondrex83	94.65	2.37	**	year83	-245.77	-8.13	***	NonTop+NonTopyear83	62.86	0.05	*
nondrex84	51.64	1.44		year84	-230.76	-8.64	***	NonTop+NonTopyear84	19.86	0.47	
nondrex85	38.01	1.23		year85	-137.48	-5.59	***	NonTop+NonTopyear85	6.23	0.76	
nondrex86	60.65	2.18	**	year86	-24.51	-1.09		NonTop+NonTopyear86	28.86	0.06	*
nondrex87	29.44	0.99		year87	-81.61	-3.39	***	NonTop+NonTopyear87	-2.34	0.90	
nondrex88	21.49	0.70		year88	-87.47	-3.66	***	NonTop+NonTopyear88	-10.29	0.60	
Obs:	524										
R-Squared:	0.62										

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued.. Credit Dummies are dummy variables (not reported) for each Moody credit level. Splits are dummy variables (not reported) indicating the bond was rated differently by each agency. NonTopUW is a dummy variable indicating that the lead underwriter of the issue is not the issuer of the

Table 2-8. Continued

largest amount of principal in the market for that year. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. DebtIPO is a dummy variable equals 1 if the issue was the first debt issue by the company since 1970; equals 0 otherwise. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. Putable is a dummy variable equals 1 is the bond issued is putable, equals 0 otherwise. Industry Dummies are dummy variables (not reported) for each one-digit SIC code. NonTopYear is the product of the NonTop dummy variable and the Year dummy. Year Dummies are dummy variable for each year from 1977-1989. For example, dummy77 equals 1 if the bond was issued in 1977; equals 0 otherwise. The value of NonTop+Year equals the distance between the UW fee of the top underwriter and all others. p-values are based on an F-test of NonTop+NonTopYear equals 0. *, **, *** indicate significance at the 10%, 5% and 1% level respectively.

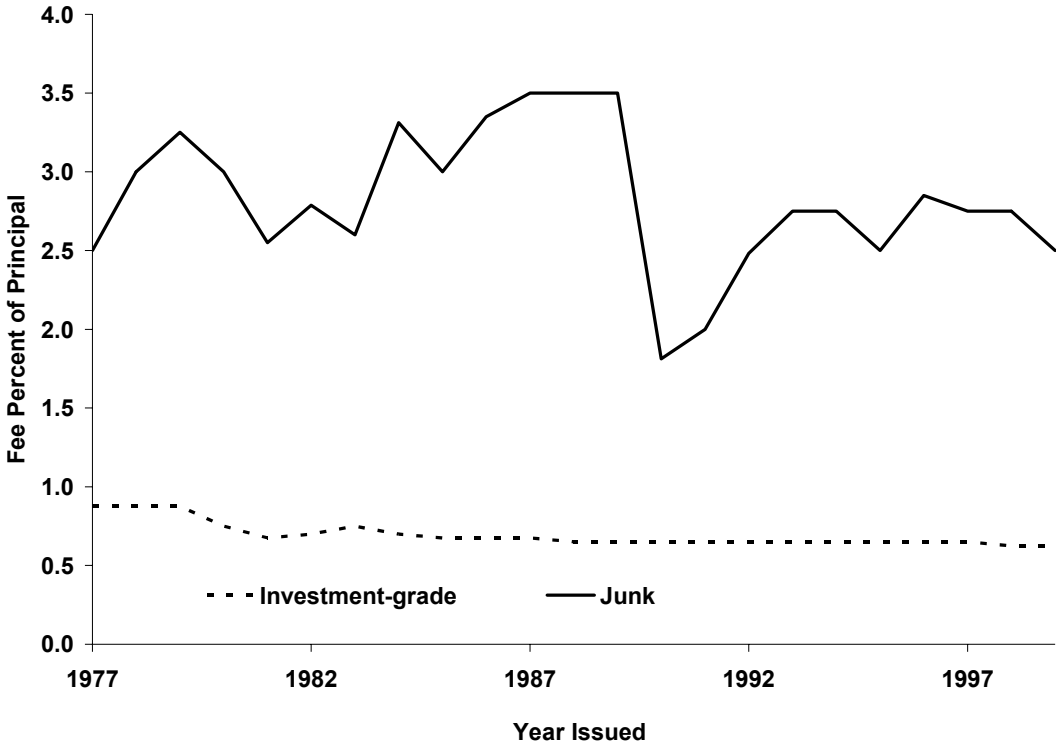

Figure 2-1. Median underwriter fees as a percent of principal issued.

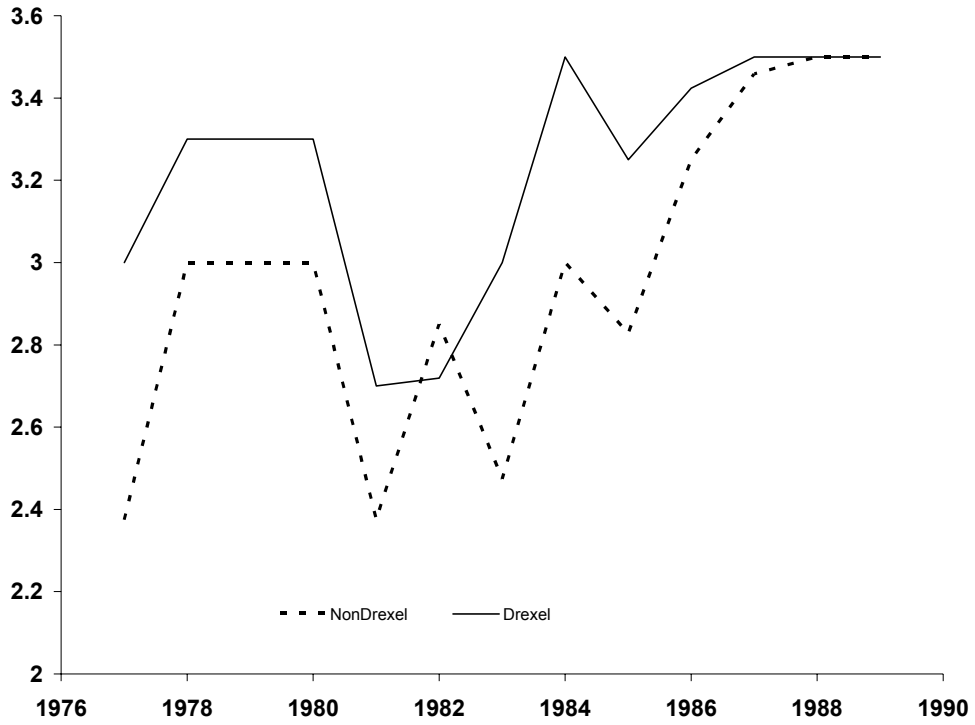

Figure 2-2. Median junk bond underwriter fees as a percent of principal 1977-1989.

CHAPTER 3
COMMERCIAL BANK ENTRY

Gande, Puri and Saunders (1999) (henceforth GPS) also examine underwriting fees for newly issued bonds from 1985-1996. They conclude that fees fell in the 1990s due to the entry of commercial banks into the bond underwriting market through Section 20 subsidiaries, and point out that the decline in fees is mainly in junk bonds. They find no evidence that commercial bank fees are lower than investment bank fees. Instead, they assert that investment banks lowered fees in response to commercial bank entry. They document that underwriting fees are negatively related to both a time dummy indicating the entry of commercial banks and the market share of the commercial banks. We offer evidence that GPS results are actually due to bank entry occurring at the same time as Drexel's exit from the market for new issue junk.

The Bank Act of 1933 (commonly know as Glass-Steagall) was a response to the chaos in the US financial system that resulted from the Great Depression. It was widely believed at the time that ownership and underwriting of securities by banks created an inherent conflict of interest and encouraged risky and sometimes unethical actions on the part of banks. The law was intended to separate the activities of commercial banking (taking deposits and making loans) from those of investment banks (issuing and trading in securities).

Ironically, just two years after he led the effort to enact the law, Carter Glass helped lead an effort to have it repealed, saying "he thought it was a mistake and an overreaction." His effort failed, and it was over 60 years before the law was finally

repealed in 1999. By the time of the official repeal, however, the Federal Reserve's re-interpretation of Section 20 of the act had already allowed commercial banks to underwrite corporate debt.

Section 20 of the Bank Act of 1933 forbids member banks from affiliating with a company "engaged principally" in the "issue, flotation, underwriting, public sale, or distribution at wholesale or retail or through syndicate participation of stocks, bonds, debentures, notes, or other securities." In 1987, the Federal Reserve ruled that "engaged principally" did not strictly prohibit banks from affiliating with companies involved in investment banking activities. Banks were allowed to have Section 20 subsidiaries which could underwrite municipal revenue bonds and commercial paper, as long as the revenues from those subsidiaries did not exceed 5% of the banks total revenues. In 1989, the Fed raised the revenue limit to 10% and added corporate bond underwriting to the activities permitted by section 20 subsidiaries. In 1991, JP Morgan became the first commercial bank since the passage of Glass-Steagall to underwrite a corporate bond issue.

A number of studies have examined the role of commercial banks in the market for underwriting securities. Puri (1994) examines the default rate of securities issued prior to the passage of Glass-Steagall, and finds that securities underwritten by commercial banks had a lower default rate than those underwritten by investment banks. Gande et al. (1997) find that banks provide a certification effect and obtain lower yields for their debt issues. Puri (1999) presents a model that demonstrates how commercial banks can better certify an issue than investment banks.

To determine the impact of commercial bank entry on junk bond fees we compare the bonds underwritten by commercial banks to those underwritten by investment banks.

Summary statistics for the bonds in our sample are shown in Table 3-1. An issue by commercial banks tends to be smaller in size, but the size of their issues gets closer to that of investment banks later in the decade. The median fee charged by commercial banks is equal to or higher than the corresponding investment bank fee for every year from 1991-1999 except for 1993 and 1999.

The market share of commercial banks is also presented in Table 3-2. In 1991, the first year a commercial bank issue enters our sample, the commercial banks issued 8 percent of the total junk principal. Their initial share increased to 11 percent in 1992, and stayed about the same until 1995, when commercial banks share of the junk market jumped to 17 percent. This was followed by another jump in 1996 to 33 percent.

In Table 3-3 we report summary statistics for each commercial bank underwriter in our sample. The majority of the principal issued comes from three commercial banks: Bankers Trust, Chase, and JP Morgan. Chase has 7 percent of the market, followed by JP Morgan and Banker's Trust with 4 percent each. Nationsbank and Citicorp each have 2 percent of the market; no other commercial bank has more than 1 percent of the market. The market share of the top six commercial banks for each year is shown in Table . Prior to 1995, no single commercial bank ever had a market share above 5 percent for the year. From 1995 to 1999, commercial banks as a whole made big gains in market share, but no single bank ever maintained a large share. For example, Chase's market share is 18 percent in 1997, but then falls to 12 percent in 1998 and 9 percent in 1999.

Based on the summary statistics, we find little to support the argument that commercial bank entry caused lower fees in the 1990s. Commercial bank median fees are the no lower than those charged by investment banks, and for the first half of the decade

commercial banks have a small market share. To be sure that we are properly controlling for issue characteristics, we replace TOPUW in regression (1) with a dummy variable CB that equals 1 if the lead underwriter is a commercial bank, and equals 0 otherwise. We run the regression on the sample of junk bonds issued from 1991-1999. The results are listed in Table 3-4. The coefficient on the CB dummy is not different from zero, indicating that after controlling for characteristics specific to each issue, commercial bank fees were no different than fees charged by other underwriters during that time.

Using a sample of bonds issued from 1985-1996, Gande, Puri and Saunders (1999) conclude that commercial banks entering the market through section 20 subsidiaries resulted in lower underwriting fees. By choosing the period 1985-1996, however, GPS divide the sample roughly in half between the Drexel dominated market (1985-1989) and the post Drexel market with commercial bank entry (1990-1996). We have shown in Table that there was a sudden sharp decline in fees for underwriting junk in 1991, and that the level of fees remained virtually the same from 1991-1996. This coincides perfectly with GPS claim that bank entry in 1989 resulted in lower fees. However, it also coincides perfectly with Drexel's exit from the market.[2]

GPS also show that underwriting fees are negatively related to the market share of commercial banks. They do this by including the variable LN_MKTSHARE in their regressions, the natural log of the market share of the commercial banks the year the bond was issued. Since this variable is zero for the period from 1985-1990, and positive every year after, it is also correlated with the presence of Drexel.

[2] Remember that the 1990 junk bond market was very small, with only 4 bonds in our sample.

It is our claim that fees are lower in the 1990s because of increased competition following Drexel's exit. We follow the method of GPS and run the following regression on our sample of corporate bonds from 1991-1999.

$$\begin{aligned} UnderwriterSpread &= \alpha_0 + \beta_{cr} CreditDummies + \beta_1 Log(Maturity) + \beta_2 Log(Size) + \beta_3 DebtIPO + \\ &+ \beta_6 LN(MKTSHARE) + \beta_{ind} IndustryDummies + Time \end{aligned} \quad (1)$$

By starting the sample in 1991 instead of 1985, we eliminate the effect of Drexel exiting the market. We extend the GPS sample from 1996 to 1999 to include issues up to the repeal of Glass-Steagall in 1999. The results are shown in Table 3-5. The coefficient on LN_MKTSHARE in this regression is small and insignificant, meaning that without the higher fees on bonds from the 1985-1989 period in the sample, there is no evidence that higher bank market share is correlated with lower underwriting fees in the 1990s junk market.

Based on these statistics, it is difficult to argue that commercial banks had a dramatic impact on underwriting fees in the bond market. Median fees for underwriting investment-grade bonds are virtually identical between 1983 and 1997. Fees for issuing junk are drastically lower after Drexel's bankruptcy in 1990. However, we find no evidence that this is due to commercial banks entering the underwriting business. We document that commercial bank's underwriting fees were not different from those charged by other underwriters during the 1990s. Also, commercial banks started with a small portion of the market and had to deal with regulation that limited the revenues they could earn from underwriting activities, and therefore limited the amount of market share they could capture.[3]

[3] From 1989-1995, The Federal Reserve required that no more the 10 percent of a Section 20's revenue could be from underwriting activities. This limit was raised to 25 percent in 1996.

Table 3-1. Summary statistics: Investment vs. commercial banks. The sample consists of all unregulated, non-financial, fixed-coupon bonds issued from 1990-1999 rated as junk by Moodys or Standard and Poor's with yield data available in SDC. Bonds rated Baa (BBB) by one agency and Ba (BB) by the other are classified as junk bonds. Bonds not rated by either agency are not included in the sample. The top panel lists issues whose lead underwriter was an investment bank; the bottom panel lists issues whose lead underwriter was a commercial bank. Market Share is in percent. Total Principal and Median Size are in millions of dollars. Median underwriter fee is the total underwriting fee for the issue in percent of total principal issued. Rating is a numerical assignment to Moody's rating: Aaa equals 1 through Caa equals 7. Split-rated bonds are assigned the average value of the two ratings.

Investment Bank Issues

	Number of Issues	Market Share	Total Principal Issued	Median Size	Median Maturity	Median Underwriter Fee	Median Rating	Debt IPOs
1991	25	92	6,459	200	10	2.0	5	3
1992	117	89	18,921	135	10	2.4	6	35
1993	147	89	25,782	125	10	2.8	6	70
1994	80	90	13,914	123	10	2.8	6	44
1995	49	83	9,873	150	10	2.5	6	23
1996	66	66	12,030	150	10	2.8	6	26
1997	82	63	16,315	150	10	2.7	6	35
1998	137	80	28,305	155	10	2.6	6	60
1999	46	60	9,462	173	10	2.5	6	12
	749		141,059					308

Commercial Bank Issues

	Number of Issues	Market Share	Total Principal Issued	Median Size	Median Maturity	Median Underwriter Fee	Median Rating	Debt IPOs
1991	4	8	575	150	5	2.7	5	1
1992	16	11	2,318	133	8	2.5	6	7
1993	23	11	3,303	130	10	2.6	6	11
1994	11	10	1,512	100	10	3.0	6	8
1995	13	17	2,036	125	10	2.9	6	4
1996	36	34	6,205	125	10	3.0	6	22
1997	55	37	9,605	150	10	3.0	6	36
1998	40	20	7,070	148	10	2.8	6	26
1999	20	40	6,367	200	8	2.5	6	8
	218	189	38,990					123

Table 3-2. Commercial bank underwriters 1991-1999. The sample includes all fixed coupon, non-convertible bonds rated junk by Moodys or S&P with yield data available in SDC. Bonds issued by regulated industries (SIC code 4) and financial firms (SIC code 6) are not included. Bonds not rated by either agency are not included in the sample. The bonds are classified as underwritten by a commercial bank if the lead (or co-lead) underwriter is a commercial bank. Principal amount and size is in millions of US dollars. Rating is a numerical assignment to Moody's rating: Aaa equals 1 through Caa equals 7. Split-rated bonds are assigned the average value of the two ratings.

Bank Underwriter	Number of Issues	Market Share	Total Principal Issued	Median Size	Median Rating	Median Underwriter Fee	Debt IPOs
BANKAMERICA	5	1	1,127	152	6.0	0.3	2
BANC-BOSTON	2	0	205	103	6.0	3.0	2
BANKERS-TRUST	49	4	7,642	115	6.0	3.0	31
CHASE	63	7	12,560	150	6.0	2.9	33
CHEMICAL	6	1	1,056	116	6.0	3.0	4
CIBC	13	1	2,473	200	6.0	3.0	6
CITICORP	24	2	3,266	128	6.0	2.7	15
DEUTSCHE-BANK	2	0	190	95	6.0	2.9	1
FIRST-CHICAGO	1	0	100	100	6.0	2.8	1
FIRST-UNION	3	0	515	115	6.0	2.8	3
G-G-NATWEST	2	0	260	130	6.0	3.4	2
JP MORGAN	26	4	6,595	150	5.8	2.4	9
NATIONSBANK	22	2	3,002	123	6.0	2.8	14
	218	22	38,990				123

Table 3-3. Percent share of the major commercial bank junk bond underwriters 1991-1999. The sample includes all fixed coupon, non-convertible bonds rated as junk by Moodys or S&P. Bonds issued by regulated industries (SIC code 4) and financial firms (SIC code 6) are not included. Bonds without a Moody's rating are assigned the corresponding S&P rating. Bonds not rated by either agency are not included in the sample. The bonds are classified as underwritten by a commercial bank if the lead (or co-lead) underwriter is a commercial bank.

Commercial Bank	1991	1992	1993	1994	1995	1996	1997	1998	1999
BANKERS-TRUST	4	4	3	5	8	15	4	-	-
CHASE	-	-	2	1	2	8	18	12	9
CIBC	-	-	-	-	-	3	6	1	-
CITICORP	2	4	5	3	-	1	1	-	-
JP MORGAN	1	3	1	1	4	2	4	1	20
NATIONSBANK	-	-	-	-	-	2	4	4	1

Table 3-4. Regressions with commercial bank (CB) dummy for issues 1991-1999. The sample includes all fixed coupon, non-convertible bonds rated junk by Moodys or S&P with yield data available in SDC. Bonds issued by regulated industries (SIC code 4) and financial firms (SIC code 6) are not included. Bonds not rated by either agency are not included in the sample. The bonds are classified as underwritten by a commercial bank if the lead (or co-lead) underwriter is a commercial bank.The regression takes the following form:

$$UnderwriterSpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_1 Log(Maturity) + \beta_2 Log(Size) + \beta_3 DebtIPO + \beta_4 Callable + \beta_5 CB + \beta_{ind} IndustryDummies + \beta_{year} YearDummies$$

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables for each Moody credit level. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. DebtIPO is a dummy variable equals 1 if the issue was the first debt issue by the company since 1970; equals 0 otherwise. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. CB is a variable equal to 1 if the lead underwriter of the issue was a commercial bank; equals 0 otherwise. Industry Dummies (not reported) are dummy variables for each single digit SIC code. Year Dummies are dummy variable for each year from 1991-1999. *, **, *** indicates significance at the 10%, 5%, and 1% level respectively.

Parameter	Estimate	t-stat	
Intercept	0.55	2.74	***
dummyBa	1.03	14.79	***
split4_6	0.10	0.29	
dummyB	1.72	25.29	***
split5_6	1.53	18.73	***
split6_7	1.88	14.76	***
dummyC	2.02	9.37	***
lmat	0.15	2.39	**
lsize	-0.07	-2.55	**
CB	-0.02	-0.46	
callable	0.22	4.54	***
debt_ipo	0.21	5.84	***
year90	0.36	1.39	
year91	0.28	2.44	**
year92	0.06	0.80	
year93	0.19	2.57	**
year94	0.24	2.92	***
year95	0.28	3.12	***
year96	0.23	2.87	***
year97	0.15	1.99	**
year98	0.04	0.61	
Obs:	970		
R-squared	0.61		

Table 3-5. Regressions with commercial bank market share 1991-1999. The sample includes all fixed coupon, non-convertible bonds rated junk by Moodys or S&P with yield data available in SDC. Bonds issued by regulated industries (SIC code 4) and financial firms (SIC code 6) are not included. Bonds not rated by either agency are not included in the sample. The bonds are classified as underwritten by a commercial bank if the lead (or co-lead) underwriter is a commercial bank.The regression takes the following form:

$$UnderwriterSpread = \alpha_0 + \beta_{cr} CreditDummies + \beta_1 Log(Maturity) + \beta_2 Log(Size) + \beta_3 DebtIPO + \beta_4 Callable + \beta_5 LN(MKTSHARE) + \beta_{ind} IndustryDummies + \beta_{year} YearDummies$$

Underwriter Spread is the total underwriting fee as a percent of the total principal amount issued. Credit Dummies are dummy variables for each Moody credit level. Log(Maturity) is the natural log of time to maturity of the bond in years. Log(Size) is the natural log of the principal size of the issue, in millions of dollars. DebtIPO is a dummy variable equals 1 if the issue was the first debt issue by the company since 1970; equals 0 otherwise. Callable is a dummy variable equals 1 is the bond issued is callable, equals 0 otherwise. LN(MKTSHARE) is the natural log of (1+ market share (in percent)) of commercial banks for that year. Industry Dummies (not reported) are dummy variables for each single digit SIC code. Year Dummies are dummy variable for each year from 1991-1999. *, **, *** indicates significance at the 10%, 5%, and 1% level respectively.

Parameter	Estimate	t-stat	
Intercept	0.91	3.01	***
dummyBa	1.03	14.79	***
split4_6	0.11	0.29	
dummyB	1.72	25.35	***
split5_6	1.53	18.73	***
split6_7	1.88	14.77	***
dummyC	2.02	9.37	***
lmat	0.15	2.42	**
lsize	-0.07	-2.55	**
lnmktshare	-0.10	-1.41	
callable	0.22	4.53	***
debt_ipo	0.21	5.82	***
year91	0.13	0.91	
year92	-0.06	-0.55	
year93	0.08	0.76	
year94	0.11	1.00	
year95	0.20	2.04	**
year96	0.21	2.71	***
year97	0.14	1.90	*
year98	-0.02	-0.26	
Obs:	970		
R-squared	0.61		

CHAPTER 4
CONCLUSION

More than a decade after the bankruptcy of Drexel, questions remain about its impact on the market for new issue bonds. Economic research has described concentrated markets by the *performance-structure hypothesis*, where firms use their high market share to keep prices high, or the *efficient-performance* hypothesis, where market share is the result of leading firms providing superior quality. We find support for the efficient-structure hypothesis in explaining Drexel's domination of the junk-bond market from 1977-1989. From 1977-1989, Drexel maintained the dominant market share while charging higher underwriting fees. By the time Milken and Drexel issued their first junk-bond in 1977, they already wielded significant market power because of their role as innovator in the secondary market for junk. This advantage in knowledge and share of the after-market resulted in substantial power in the new-issues market, resulting in higher fees for Drexel issues. As the market grew, other underwriters gained experience in the junk-bond market and over time increased their fees to match Drexel's.

The market for issuing junk in the 1990s, with Drexel out of the picture, was completely different. Fees to underwrite new junk fell dramatically when the junk market rebounded in 1992-1993, and they stayed low through the decade. In contrast to the Drexel period, the dominant underwriter in the 1990s could not duplicate Drexel's position as innovator and dominant player in the secondary market. Hence, Drexel's power to charge higher fees could not be duplicated.

Unlike previous researchers, we do not see evidence that this decline is due to commercial banks entering the market. The underwriting fees charged by commercial banks are no different than fees charged by investment banks, and the market share of commercial banks prior to 1995 was about 10%. Until 1996, Federal Reserve regulations limited the percent of total revenues commercial banks could earn from underwriting securities to 15 percent. Commercial banks simply did not have the market power in the early 1990s to impact underwriting fees.

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BIOGRAPHICAL SKETCH

Glenn Williams earned a BS in mechanical engineering from the University of South Carolina in 1990 and an MBA from Rollins College in 1997. He worked for seven years in the electric utility industry prior to beginning work on his PhD. He has 3 sons, Benjamin, Daniel and Samuel.