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The Impact of Commercial Banks on Underwriting Spreads: Evidence from Three Decades

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Abstract

This paper examines the effect of commercial bank entry on underwriting spreads for IPOs, SEOs, and debt issues using a long time series that spans 30 years, from 1975 to 2004. We find that, on average, commercial banks charge lower spreads of approximately 72 basis points for IPOs, 43 basis points for SEOs, and 14 basis points for debt over the entire sample period. The economic impact of commercial banks on lowering underwriting spreads is most significant when commercial banks were allowed to enter via Section 20 subsidiaries but persists beyond. Commercial bank entry into underwriting appears to have a procompetitive effect that lasts many years after their initial entry.

I. Introduction

Commercial banks are now active participants in the securities underwriting market, given that the barriers formed by the Glass-Steagall Act of 1933 (particularly Section 20), which prohibited commercial banks from underwriting issues, have eroded. A number of papers have examined the direct costs of underwriting, namely, underwriting spreads. However, two pieces of legislation have dramatically changed the competitive market for underwriting services by affecting the

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ability of commercial banks to underwrite issues. The first occurred in 1987, when the Federal Reserve allowed commercial banks on a case-by-case basis to underwrite commercial paper, municipal bonds, and securitization issues by setting up special Section 20 subsidiaries. In 1989 corporate debt offerings were allowed to be underwritten by the Section 20 subsidiaries of commercial banks, and in 1990 corporate equity issues (namely, initial public offerings (IPOs) and secondary equity offerings (SEOs)) were allowed. The activities of such Section 20 subsidiaries were capped as long as revenues generated from such ineligible securities amounted to no more than 5% of the subsidiaries' revenues. This cap was raised subsequently in later years. The second significant piece of legislation was the Financial Services Modernization Act, which in 1999 allowed subsidiaries of commercial banks to have unconstrained underwriting powers.

Given the stages of the above legislation that dissolved the separation between commercial banks and investment banks in underwriting, we define three different regimes. Regime 1 is the least competitive underwriting market, wherein no commercial banks were allowed to underwrite any issues (defined as 1975–1989 in the case of IPOs and SEOs, and 1975–1988 in the case of debt issues). Regime 2 is the medium competitive underwriting market, as commercial banks were allowed to underwrite issues through Section 20 subsidiaries (defined as 1990–1998 in the case of IPOs and SEOs, and 1989–1998 in the case of debt). Regime 3 (1999–2004 for IPOs, SEOs, and debt issues) is the most competitive underwriting market, as commercial banks had no restrictions placed on them and could fully compete with investment banks in underwriting issues.

This paper examines the following questions: i) Do commercial banks charge lower underwriting spreads than traditional investment banks? ii) Has there been a decline in underwriting spreads around the two major pieces of legislation relating to commercial-investment bank separation? iii) If there has been a decline, can the difference be explained by changes in characteristics of issuers and market structure? We examine a large sample of underwriting spreads for IPOs, SEOs, and debt issues for a long 30-year period (1975–2004).

Our main findings are as follows: First, we find that commercial banks *ceteris paribus* charge lower underwriting spreads than investment banks for IPOs, SEOs, and debt, respectively. Specifically, we find that on average, commercial banks charge lower spreads of approximately 72 basis points for IPOs, 43 basis points for SEOs, and 14 basis points for debt over the entire sample period. Second, we find that the least competitive underwriting market (Regime 1) has the highest underwriting spreads, followed by the medium and most competitive underwriting markets (Regimes 2 and 3). The economic magnitude of lower underwriting spreads is greatest for Regimes 2 and 3 over Regime 1, with Regimes 2 and 3 generally having similar underwriting spreads. Third, we find that commercial banks reduced underwriting spreads significantly in Regime 2 over Regime 1 (by 60 basis points in IPOs, 28 basis points in SEOs, and 12 basis points in debt). For IPOs, when comparing Regimes 3 and 2 we find a decrease of 14 basis points in Regime 3, which is much less than the 60 basis points decrease in Regime 1. No significant differences are found when we compare Regimes 2 and 3 for SEOs and debt. These results show that commercial banks have had a procompetitive effect by reducing underwriting spreads. Fourth, we examine whether the decline

in spreads is merely concentrated in higher quality issuers, possibly because these firms have greater power to bargain for lower underwriting spreads. We use as proxies for issuer quality the issuer's profits, the issuer's leverage ratio, and, in the case of debt issues, whether the issuer has investment grade debt. If the above hypothesis is to be confirmed empirically, we would expect the negative (positive) effect of profits and investment grade debt (leverage ratio) on underwriting spreads to be highest in Regime 3, followed by Regime 2, with the smallest effect in Regime 1. We find little evidence consistent with the hypothesis that higher quality issuers have been able to bargain for a greater decrease in spreads when underwriting markets are more competitive.

In interpreting our results, there are two important caveats. First, the dot-com crash and a decline in the junk bond market coincided with the post-Financial Services Modernization Act period and could therefore offer alternative explanations for declines in spreads in the post-1998 period. Second, we have focused the paper on the direct costs of issuance while ignoring any analysis of the indirect costs of issuance (namely, the initial returns earned by investors as a result of underpricing on the first day of issue). An analysis of the relationship between direct and indirect costs is an interesting issue. It is plausible that issuers and underwriters bargain over both the direct and indirect costs of issue, resulting in these two costs being jointly endogenously determined. However, difficulties in identifying suitable instrumental variables for IPOs, SEOs, and debt issues are significant enough that we leave tests of this relationship to future work.

In the remainder of the paper, we discuss the prior literature in Section II. Section III describes our sample and data. In Sections IV to VII we examine the determinants of underwriting spreads and their differential impact across the various regime(s). Section VIII presents our conclusions.

II. Prior Literature

In this section, we review the prior literature. Booth and Smith (1986) examine 964 SEOs for the sample period 1971–1982 and find underwriting spreads to be higher for industrial firms with higher idiosyncratic risk. Beatty and Welch (1996) examine 960 IPOs for the sample period 1992–1994 and find underwriting spreads to be positively related to investment bank reputation and issuer risk. Lee, Lochead, Ritter, and Zhao (1996), examine the sample period 1990–1994 and find IPO underwriting spreads to be 11% for IPOs (sample size = 1,767), SEO underwriting spreads to be 7.11% (sample size = 1,593), and debt underwriting spreads to be 2.24% (sample size = 1,092).

Chen and Ritter (2000) examine 3,203 IPOs for the period 1985–1997. They find evidence of significantly higher clustering of underwriting spreads at 7% in the later period of 1995–1997 than in the earlier period of 1985–1987. Further, they find underwriting spreads of exactly 7% in 90% of the 1,111 moderate-size IPOs (between $20 million and $80 million). Hansen (2001) examines 1,499 IPOs for the period 1980–1997 and finds evidence that the 7% underwriting contract is contractually efficient and not due to implicit collusion between the bankers. He finds that banks compete in pricing underwriting spreads on the basis of their reputation, placement service, and level of underpricing. Altinkilic and Hansen

(2000) examine 1,325 SEOs and 628 debt issues for the period 1990–1997 and find a U-shaped spread-size relationship. Their spectrum view suggests that initially fixed costs cause scale economies, but as issue size increases diseconomies of scale emerge in underwriting spreads due to increasing placement costs. They also find that the average debt underwriting spreads are lower than the average SEO underwriting spreads.

Livingston and Miller (2000) examine 2,449 debt issues for the sample period 1990–1997 and find that underwriting spreads decrease with investment bank reputation and increase with default risk and maturity. Chen and Mohan (2002) examine 806 IPOs for the period 1990–1992 and find underwriting spreads to decrease with the size of the offering. They also find that for high- and low-reputation investment banks, underwriting spreads and underpricing are positively related. No significant relationship is found for medium reputation investment banks. Hansen and Torregrosa (1992) examine 283 SEOs for the sample period 1978–1986 and find underwriting spreads to fall with issue size and risk. Mola and Loughran (2004) examine 4,814 SEOs and find underwriting spreads to be insignificantly related to SEO discounts (defined as the percentage change from the offer price to the prior day's closing price) for the 1986–1989 period and to be positively related for the 1990–1999 period.

Other studies have also examined the impact of legislation that allowed commercial banks to enter the underwriting market. Gande, Puri, and Saunders (1999) examine a 12-year period (1985–1996) for 2,992 debt issues, 4,150 IPOs, and 2,788 SEOs. They find that the entrance of commercial banks statistically significantly reduced underwriting spreads for debt issues by 24 basis points but find no such statistically significant effects for IPOs and SEOs. Fields, Fraser, and Bhargava (2003) examine the period from 1991 to 1997 for 2,388 IPOs and find that the entrance of commercial banks had no statistically significant impact on IPO underwriting spreads. Our paper extends the above literature by examining a longer time period and a fuller list of explanatory variables than previous studies.

III. Sample Creation and Data Description

The core database for our study is the U.S. public new-issues database of the Securities Data Corporation (SDC). The SDC database is compiled from regulatory filings, news sources, company press releases, and prospectuses. We examine 30 years of data from 1975 to 2004. We exclude all firms whose gross underwriting spread data were missing from the SDC database. We obtained information on issuer firm-specific characteristics, such as the date of issuance, the size of the issue (proceeds), as well information on the underwriting market, such as the names of the lead managers of each issue and their individual annual shares of underwriting in the market under consideration. We supplement the SDC database with financial variables drawn from Compustat. This results in a final sample of 10,064 issues for IPOs, 6,928 issues for SEOs, and 16,205 issues for nonconvertible straight debt issues.

In Table 1 we present descriptive statistics on underwriting spreads for IPOs, SEOs, and debt over the entire 30-year period. The mean underwriting spread for IPOs was 7.62%, SEOs had a lower mean underwriting spread of 5.08%, and debt

TABLE 1

Descriptive Statistics of Underwriting Spreads

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 30-year period from 1975 through 2004, and are obtained from the U.S. Public New Issues Database of the Securities and Data Company.

	IPOs	SEOs	Debt
#	10,064	6,928	4,672
Mean	7.623	5.081	0.875
Median	7.000	5.000	0.652
Standard deviation	1.598	1.698	0.753
5th percentile	5.500	2.526	0.250
95th percentile	10.00	8.000	2.750

had the lowest mean underwriting spread of 0.88%. We find the median IPO underwriting spread to be 7%, consistent with the results of Chen and Ritter (2000). However, we find that there is variation in IPO underwriting spreads over the 30-year period, with spreads having a standard deviation of 1.6%, the lowest 5th percentile of issues being charged a 5.5% spread and the highest 95th percentile being charged a 10% spread. In order to explore this variation in spreads further, and to control for rounding errors, we examine the number of IPOs that were charged spreads between 6.95% and 7.05% (see also a similar rounding adjustment in Chen and Ritter (2000)). Interestingly, we find a minority of our sample, namely 41.3%, to have a 7% underwriting spread even allowing for a rounding adjustment. Therefore, the 7% underwriting spread has not been as pervasive, historically speaking, as previously thought.

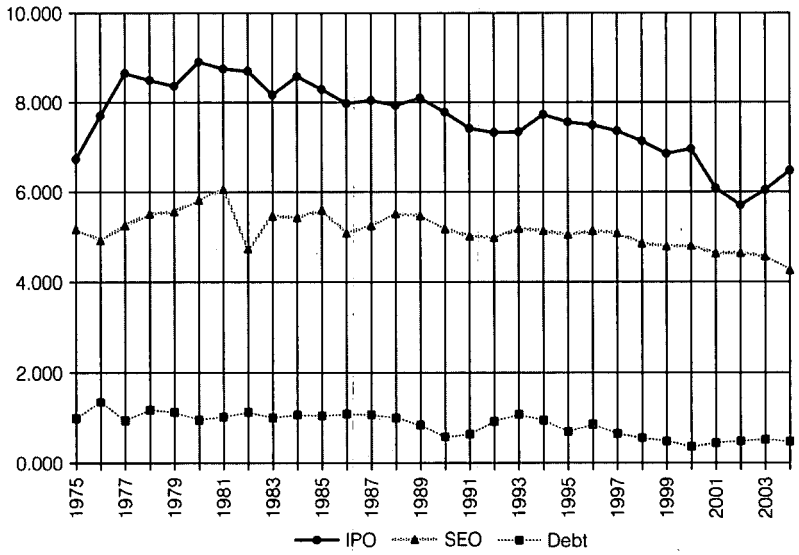
When we examine underwriting spreads on SEOs, we find the median underwriting spread to be 5%. This raises the question of whether there is a 5% "solution" for SEOs similar to the supposed 7% "solution" for IPOs. Again, we find variation in underwriting spreads, with spreads having a standard deviation of 1.7%, the lowest 5th percentile being charged a 2.5% spread and the highest 95th percentile being charged an 8% spread. Again, in order to control for rounding errors, we also examined the number of SEOs that were charged spreads between 4.95% and 5.05%. We find that only 10.1% of our entire 30-year sample had a 5% underwriting spread even allowing for rounding errors. Therefore, the 5% underwriting spread for SEOs has not been as extensive as the 7% underwriting spread for IPOs. When we examine underwriting spreads on debt, we find the median underwriting spread to be 0.65%. In order to control for rounding errors, we also examined the number of debt issues that were charged spreads between 0.60% and 0.70%. We find that only 16.5% of our sample had a 0.65% underwriting spread even allowing for rounding errors. These results show the highest spread clustering for IPOs and the least spread clustering for SEOs.

Figure 1 (Figure 2) presents the time series of mean (median) annual underwriting spreads for IPOs, SEOs, and debt over the entire sample period. We find that IPOs had the highest underwriting spreads in all years, SEOs had the second highest, and debt had the lowest. When we examine further the mean underwriting spreads for IPOs we find them to be generally greater than 8% and that in earlier years mean spreads were generally greater than median underwriting spreads. From 1990 onwards, however, the mean annual IPO underwriting spread

FIGURE 1

Mean Underwriting Spreads for IPOs, SEOs, and Debt

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for 10,064 IPOs for the 30-year period 1975–2004, and are obtained from the U.S. Public New Issues Database of the Securities and Data Company.



starts to fall below 8%, reaching approximately 6% in 2001–2003. Having a mean underwriting spread above 7%, historically, suggests that getting a 7% underwriting spread was a bargain for issuers during this period. In the later periods, getting 7% underwriting spreads is no longer as attractive to issuers when mean spreads approached 6%. These results do not generally fit the view that the clustered 7% spreads are observed because of collusion (Chen and Ritter (2000)) but are consistent with the view suggested by our paper that competitive effects change over time (see also the tests and results of Hansen (2001)). Examining SEOs we find mean annual underwriting spreads generally to be between 4% and 6%, with mean and median spreads closely aligned. We find a similar pattern for debt issues, although the mean and median levels are much smaller in magnitude in the 0.25%–1.4% range. In Table 2 we present the tabular evidence for annual mean and median underwriting spreads. Consistent with the graphical presentation, we find that IPOs had the highest underwriting spreads in all periods, SEOs the second highest, and debt the lowest underwriting spreads.

IV. Underwriting Spreads Over the Entire Sample Period

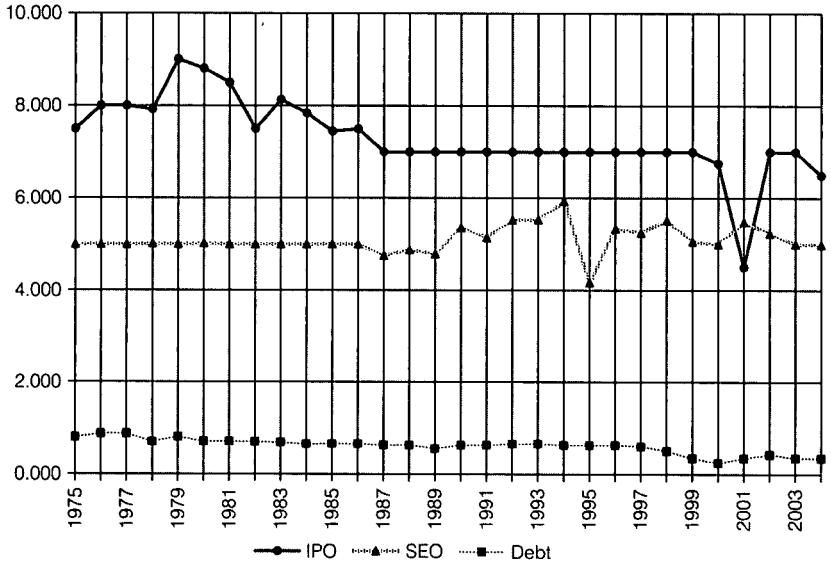
A. Commercial Bank Entry and Underwriting Spreads

We begin by examining whether equity and debt issues underwritten by commercial banks were charged lower or higher underwriting spreads. Consistent with the previous literature, we create a variable COMMERCIAL_BANK that

FIGURE 2

Median Underwriting Spreads for IPOs, SEOs, and Debt

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for 6,928 SEOs for the 30-year period 1975–2004, and are obtained from the U.S. Public New Issues Database of the Securities and Data Company.



is set equal to unity if the issuer's underwriter is a Section 20 subsidiary of a commercial bank between 1990 and 2000 or a subsidiary of a commercial bank holding company after 2000. This variable is set equal to zero otherwise. Data for the construction of whether the underwriter is a Section 20 subsidiary of a commercial bank, or a subsidiary of a commercial bank, was obtained from the Appendix of Cornett, Ors, and Tehranian (2002) and from the Federal Reserve's Web site (http://www.federalreserve.gov/GeneralInfo/Subsidiaries/#section20). If commercial bank entry had a procompetitive effect on underwriting spreads, we expect to find spreads to be negatively related to the COMMERCIAL_BANK dummy.

We run OLS regressions for IPOs, SEOs, and debt underwriting spreads on COMMERCIAL_BANK and other control variables. All standard errors are corrected for heteroscedasticity using the White correction. The regression results for the entire 30-year sample period are given in Table 3. In the first specification, we run a univariate regression of underwriting spreads on COMMERCIAL_BANK only. We find COMMERCIAL_BANK to be strongly negatively related to underwriting spreads at the 1% level for all three types of securities. Commercial banks charge lower underwriting spreads of approximately 58 basis points for IPOs, 75 basis points for SEOs, and 11 basis points for debt. This presents preliminary univariate evidence in support of the view that commercial banks charge lower spreads to issuers.

TABLE 2

Distribution of Underwriting Spreads Over Time

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 35-year period from 1970 through 2004, and are obtained from the U.S. Public New Issues Database of the Securities and Data Company.

	IPO			SEO			Debt		
Year	#	Mean	Median	#	Mean	Median	#	Mean	Median
1975	4	6.728	6.496	58	5.179	4.875	171	0.999	0.800
1976	31	7.706	7.500	114	4.934	4.786	129	1.357	0.877
1977	26	8.653	8.000	69	5.263	5.357	82	0.950	0.875
1978	29	8.497	8.000	99	5.515	5.145	58	1.185	0.700
1979	60	8.366	7.917	93	5.565	5.522	83	1.129	0.805
1980	147	8.903	9.000	204	5.817	5.528	155	0.963	0.704
1981	348	8.751	8.800	222	6.062	5.926	150	1.029	0.707
1982	120	8.697	8.497	234	4.745	4.167	199	1.129	0.700
1983	677	8.165	7.500	509	5.468	5.333	134	1.013	0.687
1984	345	8.583	8.125	145	5.431	5.250	157	1.066	0.650
1985	291	8.292	7.843	213	5.601	5.515	299	1.049	0.654
1986	714	7.975	7.451	283	5.090	5.057	523	1.091	0.654
1987	542	8.042	7.500	182	5.254	5.000	403	1.073	0.627
1988	275	7.936	7.000	76	5.520	5.481	328	1.002	0.627
1989	242	8.093	7.000	124	5.472	5.231	308	0.843	0.551
1990	210	7.779	7.000	87	5.186	5.000	248	0.582	0.625
1991	389	7.417	7.000	258	5.022	4.993	497	0.642	0.626
1992	572	7.324	7.000	256	4.987	4.997	680	0.932	0.650
1993	731	7.341	7.000	380	5.188	5.000	771	1.078	0.655
1994	562	7.724	7.000	246	5.145	4.996	451	0.955	0.626
1995	544	7.559	7.000	340	5.051	5.013	755	0.706	0.625
1996	804	7.487	7.000	384	5.139	5.000	700	0.859	0.627
1997	558	7.360	7.000	354	5.089	5.014	1018	0.657	0.600
1998	345	7.131	7.000	242	4.861	5.000	1613	0.563	0.500
1999	512	6.849	7.000	283	4.799	5.000	1372	0.493	0.350
2000	372	6.959	7.000	286	4.806	5.000	1192	0.366	0.250
2001	114	6.085	6.748	263	4.641	5.000	1183	0.451	0.348
2002	141	5.700	4.500	252	4.649	5.000	869	0.491	0.427
2003	110	6.041	7.000	295	4.568	5.000	931	0.522	0.353
2004	249	6.473	7.000	377	4.263	4.748	746	0.481	0.350

B. Description of Control Variables

To examine whether the negative relationship between COMMERCIAL_BANK and underwriting spreads remains with the inclusion of other control variables that prior literature has found to be related to underwriting spreads, we use multivariate regressions that include a large number of such control variables. These control variables are described below and are summarized in the Appendix. Their expected relationship to underwriting spreads is also summarized in Table 4.

Specifically, we control for the reputation of the lead underwriting firm (REPUTATION), defined as the percentage market share of the lead underwriter each year (Gande, Puri, and Saunders (1999), Aggarwal, Prabhala, and Puri (2002)). Theoretical papers, such as Titman and Trueman (1986), Carter and Manaster (1990), Chemmanur and Fulgheri (1994) and Fernando, Gatchev, and Spindt (2005) suggest that higher quality issuers would "match" with higher reputation underwriters, suggesting a negative relationship between reputation and underwriting spreads. However, the existing empirical evidence of underwriter reputation on spreads has been mixed. For example, Livingston and Miller (2000) find a negative relationship, Gande, Puri, and Saunders (1999) and Fields, Fraser, and Bhargava (2003) find an insignificant relationship, and Beatty and Welch (1996)

TABLE 3

The Impact of Commercial Banks as Underwriters on Underwriting Spreads

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 30-year period, from 1975 through 2004, and are obtained from the U.S. Public New Issues Database of the Securities and Data Company. All variables are defined in the text and the Appendix, and all standard errors are corrected for heteroscedasticity using the White correction.

Variables	IPOs	SEOs	Debt	IPOs	SEOs	Debt
INTERCEPT	7.633***	5.117***	0.884***	7.957***	5.050***	1.429***
	(473.14)	(243.20)	(76.33)	(114.24)	(58.25)	(10.60)
COMMERCIAL_BANK	−0.582***	−0.746***	−0.106***	−0.721***	−0.427***	−0.143***
	(−7.36)	(−10.15)	(−2.89)	(−9.45)	(−5.88)	(−4.97)
REPUTATION	—	—	—	−0.062***	−0.084***	−0.013***
				(−31.21)	(−25.42)	(−7.78)
PROFIT	—	—	—	−0.088*	−0.307***	−0.349**
				(−1.67)	(−3.81)	(−2.47)
DEBT	—	—	—	−0.033	−0.008	0.154***
				(−1.10)	(−0.16)	(2.74)
MISSING_FINANCIAL	—	—	—	0.296***	0.229***	−0.001
				(6.24)	(3.36)	(−0.03)
INVESTMENT_GRADE	—	—	—	—	—	−1.076***
						(−29.83)
VOLATILITY	—	—	—	9.254***	21.529***	12.089***
				(11.58)	(17.72)	(9.58)
MISSING_VOLATILITY	—	—	—	0.651***	2.399***	0.868***
				(13.94)	(18.71)	(8.64)
INVERSE_OF_ISSUE_SIZE	—	—	—	0.847***	3.434***	0.544
				(8.13)	(7.12)	(1.27)
MARKET_VALUE/ISSUE_SIZE	—	—	—	—	−0.032**	−0.000*
					(−2.08)	(−1.76)
STAR_ANALYST	—	—	—	−0.897***	−0.329***	−0.120***
				(−38.68)	(−8.89)	(−6.43)
NUMBER_OF_ISSUES	—	—	—	−0.037***	−0.003	0.001
				(−5.34)	(−0.26)	(0.35)
TCU	—	—	—	−0.194***	−0.641***	0.092***
				(−4.44)	(−12.63)	(3.86)
FIR	—	—	—	−0.858***	−0.261***	−0.212***
				(−23.02)	(−4.63)	(−8.68)
TECHNOLOGY	—	—	—	−0.128***	0.065	−0.051*
				(−4.36)	(1.42)	(−1.69)
LMAT	—	—	—	—	—	−0.065*
						(−1.81)
HMAT	—	—	—	—	—	0.175***
						(9.98)
CALLABLE	—	—	—	—	—	−0.150***
						(−6.16)
TBILL	—	—	—	—	—	0.041**
						(2.25)
INTER	—	—	—	—	—	−0.106**
						(−2.36)
LONG	—	—	—	—	—	0.112***
						(2.87)
Adjusted R^2	0.002	0.009	0.001	0.388	0.358	0.483

***, **, and *indicate statistically significant at the 1%, 5%, and 10% levels, respectively.

and Hansen (2001) find a positive relationship. In accordance with the theoretical literature discussed above, we a priori expect a negative relationship between REPUTATION and underwriting spreads.

We also control for issuer quality, hypothesizing that higher quality firms are charged lower spreads. Following Hansen (2001), we include PROFIT, defined as the ratio of operating profit before depreciation to total assets and DEBT, defined as the ratio of total debt to assets. We find that SDC and Compustat did not provide financial statement data for a number of issuer firms. Rather than discarding these firms however, we included a dummy variable MISSING_FINANCIAL

TABLE 4
Expected Relationship Between Underwriting Spreads and Various Variables

	Expected Sign
COMMERCIAL_BANK	−
REPUTATION	−
PROFIT	−
DEBT	+
INVESTMENT_GRADE (for debt only)	−
VOLATILITY	+
INVERSE_OF_ISSUE_SIZE	+
MARKET_VALUE/ISSUE_SIZE (for SEO and debt only)	+
STAR_ANALYST	±
NUMBER_OF_ISSUES	±

All variables are defined in the text and the Appendix.

that is set equal to unity when these accounting variables are unavailable, and zero otherwise. In such cases of missing data we also set the accounting variables (PROFIT and/or DEBT) equal to zero. For debt issues, as in Gande, Puri, and Saunders (1999), we also control for the credit rating of the issuer. We define a variable INVESTMENT_GRADE, that is set equal to unity if the firm has a Moody's investment debt rating of Baa through Aaa, and zero otherwise. We posit a positive relationship between underwriting spreads and DEBT, and a negative relationship for PROFIT and INVESTMENT_GRADE.

An underwriting contract between an issuer and an underwriter can be viewed as a put option written by the underwriter (and bought by the issuer), with a strike price equal to the offer price and the time to maturity equal to time until the issue date. In this paradigm, the higher the firm's risk, the higher the value of the put, for which the underwriter would charge higher spreads, i.e., underwriting spreads are like the premium paid on a put option. Accordingly, we expect that the higher the firm risk the greater the underwriting spread (consistent with Booth and Smith (1986) and Beatty and Welch (1996), among others). We capture the issuer's risk by stock return volatility (VOLATILITY) in the year before the issue for SEOs and debt, and the year after the issue for IPOs. This variable is calculated using daily stock return data from CRSP (Hansen (2001)). Although the calculated stock return volatility is measured ex post for IPOs, assuming rational expectations, this variable should capture the ex ante stock price risk of the issue. If we are unable to calculate the stock return volatility of the issuer, then a MISSING_VOLATILITY dummy is set equal to unity, and zero otherwise, and VOLATILITY is set to zero.

Many studies have found that underwriting spreads experience significant economies of scale. In order to examine this effect we create a variable INVERSE_OF_ISSUE_SIZE, that is defined as the inverse of the 2004 inflation adjusted dollar value of issue size (Altinkilic and Hansen (2000)). The inflation adjustment uses CPI as the implicit deflator. If there are economies of scale, one would expect to find a positive relationship between this variable and underwriting spreads. For SEOs and debt however, Altinkilic and Hansen (2000) find that the actual cost curve is U-shaped, and consistent with their approach, we create a variable that is the market value of the firm divided by issue size (MARKET_VALUE/ISSUE_

SIZE). If a U-shaped relationship is to hold, we expect to find a positive relationship between this variable and SEO and debt spreads.

Mola and Loughran (2004) and Cliff and Denis (2004) find that issuer firms are increasingly "buying" analyst coverage (and underwriters are "selling" analyst coverage) along with pricing and distribution services. We use data from past issues of Institutional Investor to classify star analysts as relating to underwriters with the highest overall analyst ratings by major money management firms in Institutional Investor's All America Research Team. Consistent with Mola and Loughran (2004), we create the variable STAR_ANALYST, which is set equal to unity if the underwriter has a star analyst, and zero otherwise. If analyst coverage is costly for underwriting firms, we would expect to find a positive relationship between this variable and underwriting spreads. On the other hand, if good issuers are matched to higher-reputation banks (which have the star analysts), one would expect to find a negative relationship between this variable and underwriting spreads. Moreover, star analysts may also help to reduce new issue distribution costs by attracting investor interests, thus lowering underwriting spreads.

In order to control for the effect of industry on underwriting spreads, we create three "industry" variables. The first industry variable is TCU (which stands for transportation, communication, and utility issuers), and is set equal to unity if the issuer belonged to an industry whose one-digit SIC code started with 4, and zero otherwise. The second industry variable is FIR (which stands for depository and nondepository financial companies, insurance, and real estate issuers), and is set equal to unity if the issuer belonged to an industry whose one-digit SIC code started with 6, and zero otherwise. The third industry variable is TECHNOLOGY and is set equal to unity if the issuer's SIC code was equal to either 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7378, or 7379, and zero otherwise (Loughran and Ritter (2002), Mola and Loughran (2004)).

It is possible that when the number of new issues is high, issuers are charged higher underwriting spreads because the underwriting market has "fixed short-run capacity." Accordingly, we create a variable NUMBER_OF_ISSUES, which is the total number of issues in that year for, respectively, IPOs, SEOs, and debt. We expect a positive relationship to exist between underwriting spreads and NUMBER_OF_ISSUES. An alternative argument suggests a negative relationship because issuers have greater bargaining power in "hot markets" when the number of issues is high.

In the case of the debt regressions, we include additional control variables (see also, Gande, Puri, and Saunders (1999)). The first two variables deal with the maturity of debt: LMAT is a dummy variable for short-term debt and is set to unity if the debt issue has a maturity of less than five years, and HMAT is a dummy variable for long-term debt and is set to unity if the debt issue has maturity greater than 15 years. For intermediate-term debt whose maturity is between five years and 15 years, both LMAT and HMAT are set to zero. The third is a dummy variable CALLABLE that is set equal to unity if the debt issue is a callable bond, and zero otherwise. The last three variables deal with the shape of the term structure of interest rates. Specifically, we define a variable TBILL, which is the one-month

lagged values of the monthly returns on one-year government bills; a variable INTER, which is the one-month lagged value of the monthly return on five-year government bonds; and a variable LONG, which is the one-month lagged value of the monthly return on 20-year government bonds.

C. The Effects of Control Variables on the Commercial Bank Entry-Underwriting Spreads Relationship

Given the above control variables, we examine whether their inclusion affects the prior negative relationship found in Section IV.A. between COMMERCIAL_BANK and underwriting spreads. After including the additional control varaiables, we find that the coefficients on COMMERCIAL_BANK remain negative and significant in all three regressions (IPO, SEO, and debt). Controlling for all other independent variables, commercial banks on average charged lower spreads of approximately 72 basis points for IPOs, 43 basis points for SEOs, and 14 basis points for debt over the 30-year period. This negative relationship supports the results of Gande, Puri, and Saunders (1999) for debt issues but is in contrast to their insignificant relationship for IPOs and SEOs. They, however, only examined a relatively shorter time period (12 years from 1985 to 1996). Our results are also in contrast to Fields, Fraser, and Bhargava (2003), who examine a relatively short time period (six years from 1991 to 1997) and find that the entrance of commercial banks had no significant impact on IPO underwriting spreads. Therefore, examining a longer time period of 30 years can significantly change the results and thus the conclusions.

In examining the other independent variables, we find that investment bank reputation is significantly negatively related to underwriting spreads for all three types of securities. This is consistent with the theories of Titman and Trueman (1986), Carter and Manaster (1990), Chemmanur and Fulgheri (1994), and Fernando, Gatchev, and Spindt (2005), and with the empirical results of Livingston and Miller (2000). Consistent with our a priori expectation, issuer quality as proxied by PROFITS is negatively related to underwriting spreads for all three types of securities. For debt issues, we find that investment grade debt (INVESTMENT_GRADE) is negatively related to underwriting spreads. These results suggest that higher quality issuers are charged lower underwriting spreads. We also find that issuer risk (VOLATILITY) is negatively related to underwriting spreads for all three types of securities.

We find a strong positive relationship between underwriting spreads and the INVERSE_OF_ISSUE_SIZE. This suggests that there are significant economies of scale for all three types of securities. For SEOs and debt, we find a negative relationship between underwriting spreads and MARKET_VALUE/ISSUE_SIZE, rather than the U-shaped relationship found by Altinkilic and Hansen (2000). We conducted robustness tests (results not reported) on our negative relationship finding. First, we dropped all variables except INVERSE_OF_ISSUE_SIZE and MARKET_VALUE/ISSUE_SIZE in order to see whether collinearity with one or more of our larger sets of control variables was an issue. We still find a negative relationship between underwriting spreads and MARKET_VALUE/ISSUE_SIZE.

Second, we restricted our sample period to 1990–1997, the same sample period as Altinkilic and Hansen (2000), and again we find a negative relationship between underwriting spreads and MARKET_VALUE/ISSUE_SIZE. Importantly, however, our sample size of SEOs (and debt issues) is much larger than that of Altinkilic and Hansen (2000), with 2,218 SEOs (2,151 debt issues) in our sample compared with 1,325 SEOs (628 debt issues) in Altinkilic and Hansen (2000). Our differences in results seem puzzling.

In contrast to the argument that star analysts can help underwriters in charging higher underwriting spreads, we find a negative relationship between STAR_ANALYST and underwriting spreads. When we calculate the correlation between STAR_ANALYST and REPUTATION, we find it to be 0.54. This positive correlation and the negative relationship are supportive of the view that good issuers are matched to higher reputation banks (which generally have star analysts) and/or star analysts help lower new issue distribution costs, which are reflected in lower underwriting spreads. We also find a negative relationship between NUMBER_OF_ISSUES and underwriting spreads for IPOs, although this relationship is insignificant for SEOs and debt. The negative relationship for IPOs is consistent with the argument that issuers have greater bargaining power in "hot" new issue markets, and tends to reject the fixed short-run capacity view of underwriting markets.

We also find significant industry effects in underwriting spreads. Specifically, we find a negative relationship between FIR and underwriting spreads, suggesting that depository and nondepository financial companies, insurance, and real estate issuers are charged lower spreads; a negative relationship between TCU and underwriting spreads in equity issues, suggesting that relatively regulated industries such as transportation, communication, and utility equity issuers are charged lower spreads; a positive relationship between TCU and underwriting spreads for debt; and a negative relationship between technology companies (TECHNOLOGY) and underwriting spreads for IPOs and debt. The negative relationship on TECHNOLOGY in IPOs might be driven by the Internet bubble period that generally overlaps with Regime 2. We check for this possibility later in this paper.

In the case of the debt regressions and the debt-specific control variables, we find that short term debt (LMAT) has a negative relationship with underwriting spreads, and long-term debt (HMAT) has a positive relationship with underwriting spreads. Both the short end (TBILL) and the long end (LONG) of the term structure of interest rates has a positive relationship with underwriting spreads, with the intermediate term having a negative relationship. Finally, callable bonds (CALLABLE) have lower underwriting spreads.

In Table 5, we present the average market share of commercial banks for all three securities in our sample. As expected, commercial banks have 0% market share in Regime 1. In Regime 2, we find commercial banks gradually increasing their market share in IPOs and SEOs but at a much higher rate in debt. Specifically, in Regime 2, the average market share of commercial banks in IPOs is 1.63%, in SEOs is 1.65%, and in debt is 7.59%. We observe that the market share of commercial banks is much higher in Regime 3, with an average market share in IPOs of 16.6%, in SEOs of 20%, and in debt of 30.3%.

TABLE 5

Market Shares of Commercial Banks

Year	IPOs	SEOs	Debt
1975	0.00%	0.00%	0.00%
1976	0.00%	0.00%	0.00%
1977	0.00%	0.00%	0.00%
1978	0.00%	0.00%	0.00%
1979	0.00%	0.00%	0.00%
1980	0.00%	0.00%	0.00%
1981	0.00%	0.00%	0.00%
1982	0.00%	0.00%	0.00%
1983	0.00%	0.00%	0.00%
1984	0.00%	0.00%	0.00%
1985	0.00%	0.00%	0.00%
1986	0.00%	0.00%	0.00%
1987	0.00%	0.00%	0.00%
1988	0.00%	0.00%	0.00%
1989	0.00%	0.00%	0.74%
1990	0.01%	0.00%	1.23%
1991	0.02%	0.00%	3.86%
1992	1.29%	0.00%	5.29%
1993	0.90%	1.66%	5.85%
1994	0.44%	2.01%	11.63%
1995	1.09%	1.67%	11.92%
1996	2.66%	0.58%	13.76%
1997	4.60%	1.63%	13.99%
1998	3.69%	7.26%	16.53%
1999	5.21%	10.20%	19.52%
2000	4.48%	9.84%	21.41%
2001	8.79%	14.97%	25.42%
2002	32.11%	23.56%	28.97%
2003	24.72%	30.88%	43.09%
2004	24.17%	30.37%	43.09%
Mean market shares for Regime 1 (1975–1990 for equity and 1975–1989 for debt)	0.00%	0.00%	0.00%
Mean market shares for Regime 2 (1990–1998 for equity and 1989–1998 for debt)	1.63%	1.65%	8.48%
Mean market shares for Regime 3 (1999–2004 for both equity and debt)	16.58%	19.97%	30.25%

V. Different Regulatory Regimes and Underwriting Spreads

A. Hypotheses

If commercial bank entry raises competition in the market for underwriting services, we can test the hypothesis that the least competitive underwriting market (Regime 1) will have the highest underwriting spreads, followed by the medium competitive underwriting market (Regime 2), and the lowest underwriting spreads in the most competitive underwriting market (Regime 3).

In addition, the bargaining power of underwriters over issuing firms decreases as the underwriting market becomes more competitive and they have to compete for both low- and high-quality issues. Consequently, while the relationship between issuer quality and underwriting spreads should be negative in all three regimes, with increased competition in Regimes 2 and 3, better quality issuers can potentially bargain for a greater decrease in underwriting spreads than lower quality issuers. Accordingly, we would expect the negative relationship between issuer quality and underwriting spreads to increase in Regime 2, and be the highest in Regime 3. Consistent with our analysis in Section IV.A above, we proxy for better issuer quality by higher PROFITS and lower DEBT for all three types of securities, and for debt also use the dummy INVESTMENT_GRADE

equal to unity if the issue is investment grade, and zero otherwise. If the hypothesis that the bargaining power of underwriters over issuing firms decreases as the underwriting market becomes more competitive is to be confirmed empirically, we would expect the negative (positive) effect of PROFITS and INVESTMENT_GRADE (DEBT) on underwriting spreads to be the largest in Regime 3, followed by Regime 2, with the smallest effect in Regime 1.

B. Differences in Underwriting Spreads (Means, Medians, and Modes) across the Three Regimes

1. IPOs

In Table 6, we present the means, medians, and modes of underwriting spreads in the three regulatory regimes. For IPOs, we find Regime 1 to have a mean underwriting spread of 8.24%, Regime 2 a mean underwriting spread of 7.45%, and Regime 3 a mean underwriting spread of 6.59%. A difference in means test, using the standard student *t*-test, finds Regime 1 (the least competitive) to have the highest statistically significant underwriting spreads, followed by Regime 2 (medium competitive) and Regime 3 (the most competitive). To ensure that these results are not due to distributional assumptions made about underwriting spreads, we also conduct Mann-Whitney rank sum tests to examine for differences in medians across the three regimes. We find that Regime 1 has a median underwriting spread of 7.7%, Regime 2 has a median underwriting spread of 7%, and Regime 3 has a median underwriting spread of 7%. The Mann-Whitney rank sum test shows Regime 1 to have significantly higher median underwriting spreads than Regimes 2 and 3. The above results suggest that IPO underwriting spreads decreased as competition increased across the three regimes, with the strongest economic impact coming in Regime 2 over Regime 1.

TABLE 6

Difference in Underwriting Spreads across Regimes

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 30-year period from 1975 through 2004 and are obtained from the U.S. Public New Issues Database of the Securities and Data Company. Regime 1 is defined as 1975–1989 in the case of IPOs and SEOs and 1975–1988 in the case of debt issues. Regime 2 is defined as 1990–1998 in the case of IPOs and SEOs and 1989–1998 in the case of debt. Regime 3 is defined as 1999–2004 for IPOs, SEOs, and debt issues. The difference in means tests uses the standard *t*-statistics, and the difference in median test uses the Mann-Whitney rank sum test. In the last two columns, we present the *t*-statistics for the difference in means test and the *z*-statistics for the Mann-Whitney rank sum test.

	Regime 1	Regime 2	Regime 3	Regimes 2–1	Regimes 3–2
IPOs					
Means	8.240	7.447	6.588	−23.80***	−20.55***
Medians	7.700	7.000	7.000	16.96***	−3.11***
Mode	10.000	7.000	7.000	—	—
SEOs					
Means	5.406	5.076	4.601	−6.81***	−10.73***
Medians	5.238	5.000	5.000	5.19***	5.47***
Mode	8.000	5.000	5.000	—	—
Debt					
Means	1.176	0.937	0.697	−5.58***	−11.07***
Medians	0.875	0.653	0.627	7.72***	13.08***
Mode	0.875	0.650	0.652	—	—

***, ***, and * indicate statistically significant at the 1%, 5%, and 10% levels, respectively.

We next examine whether the focal point for clustering (the mode of the distribution) has also declined over the three regimes. We find that Regime 1 had the highest mode of 10%, followed by Regimes 2 and 3 (each with 7%). Therefore the clustering of IPO underwriting spreads has fallen from Regime 1 (10%) to Regimes 2 and 3 (7%). Consistent with the analysis of Hansen (2001), we also examined the deviations from the mode in the three regimes. We calculate thec percentage of firms that are below the mode ±0.05% (to control for rounding errors). In Regime 1, we find that 68% of the issues had underwriting spreads below 9.95%, 30.7% of the issues had underwriting spreads between 9.95% and 10.05%, and 1.3% of the issues had underwriting spreads above 10.05%. In Regime 2, we find that 18.9% of the issues had underwriting spreads below 6.95%, 52.9% of the issues were between 6.95% and 7.05%, and 28.2% of the issues had underwriting spreads above 7.05%. In Regime 3, we find that 27.7% of the issues had underwriting spreads below 6.95%, 67% of the issues were between 6.95% and 7.05%, and 5.3% of the issues were above 7.05%.

These results clearly imply that for IPOs there has been an increased tendency for underwriters to cluster at the mode—though the mode fell between Regime 1 and Regimes 2 and 3. Greater clustering suggests that underwriters' "preferred habitats" (or modes) have become increasingly similar with the passage of time, with 30.7% of spreads at the mode in Regime 1, 52.9% in Regime 2 and 67% in Regime 3. Interestingly, however, in Regime 1 there is a greater proportion of IPO spreads below the mode than in either Regimes 2 or 3 (and vice-versa for above the mode). Thus the results regarding the density "mass" around the mode suggest that underwriters were more willing to deviate and price below the modal preferred habitat in Regime 1 than in either Regimes 2 and 3.

2. SEOs

We next examined the effect of increased bank competition for SEOs. We find that Regime 1 had a mean underwriting spread of 5.41%, Regime 2 had a mean underwriting spread of 5.08%, and Regime 3 had a mean underwriting spread of 4.6%. We also find that the differences across the three regimes are statistically significant at the 1% level. With respect to the median levels we find a similar pattern: Regime 1 had a median underwriting spread of 5.24%, Regime 2 had a median underwriting spread of 5%, and Regime 3 also had a median underwriting spread of 5%, with the differences between Regimes 1 and 2 (1 and 3) statistically significant at the 1% level. This is evidence that SEO underwriting spreads decreased as competition increased across the three regimes, with the strongest economic impact coming in Regime 2 relative to Regime 1 for SEOs. We find Regime 1 to have a mode of 8%, Regime 2 with a mode of 5%, and Regime 3 with a mode of 5%. Therefore, the clustering of SEO underwriting spreads has fallen from Regime 1 (8%) to Regimes 2 and 3 (5%).

Consistent with the analysis of Hansen (2001), we examined the deviations from the mode in the three regimes by calculating the percentage of firms that are below the mode ±0.05% (to control for rounding errors). In Regime 1, we find that 89.8% of the issues had underwriting spreads below 7.95%, 3.1% of the issues had underwriting spreads between 7.95% and 8.05%, and 7.1% of the issues had underwriting spreads above 8.05%. In Regime 2, we find that 44.5% of the issues

had underwriting spreads below 4.95%, 7.5% of the issues were between 4.95% and 5.05%, and 47.9% of the issues were above 5.05%. In Regime 3, we find that 47.8% of the issues had underwriting spreads below 4.95%, 11.4% of the issues were between 4.95% and 5.05%, and 40.5% of the issues were above 7.05%.

As for IPOs, these results imply that for SEOs there has been an increased tendency for underwriters to cluster at the mode—with the mode falling between Regime 1 and Regimes 2 and 3. However, the density at the mode is far lower for SEOs than for IPOs. Greater clustering suggests that underwriters' "preferred habitats" have become increasingly similar with the passage of time, with 3.1% of spreads at the mode in Regime 1, 7.5% in Regime 2, and 11.4% in Regime 3. As for IPOs, in Regime 1, there is a greater proportion of SEO spreads below the mode than in either Regimes 2 or 3 (and vice-versa for above the mode).

3. Debt

Examining the effect of increased competition for debt, we find that Regime 1 had a mean underwriting spread of 1.18%, Regime 2 had a mean underwriting spread of 0.94%, and Regime 3 had a mean underwriting spread of 0.7%, with these differences statistically significant at the 1% level. On examining median levels, we find a similar pattern: Regime 1 had a median underwriting spread of 0.87%, Regime 2 had a median underwriting spread of 0.65%, and Regime 3 had a median underwriting spread of 0.62%, with the differences between Regimes 1 and 2 (and 3) again statistically significant at the 1% level. The above results suggest that as competition increased across the three regimes, debt underwriting spreads decreased, with the strongest economic impact coming in Regime 2 relative to Regime 1. Finally, Regime 1 had a mode of 0.875%, Regime 2 had a mode of 0.65%, and Regime 3 had a mode of 0.65%.

We examined the deviations from the mode in the three regimes by calculating the percentage of firms that are below the mode $\pm 0.05\%$ (to control for rounding errors). In Regime 1, we find that 65.1% of the issues had underwriting spreads below the mode, 15.5% had underwriting spreads around the mode, and 19.4% of the issues had underwriting spreads above the mode. In Regime 2, we find that 12.3% of the issues had underwriting spreads below the mode, 10.5% of the issues were around the mode, and 77.2% of the issues were above the mode. In Regime 3, we find that 31.8% of the issues had underwriting spreads below the mode, 15.4% of the issues were around the mode, and 52.9% of the issues were above the mode.

In the case of debt, the percentage of spreads clustering at the mode actually fell between Regimes 1 and 2 (15.5% versus 10.5%), although the mode was lower in Regime 2. This may reflect commercial bankers entering in Regime 2 with different debt spread "preferred habitats" from traditional investment bankers with an associated reduction in the post-commercial bank entry debt spread mode. Note that in Regime 3, however, the mode rises again to 15.4%, similar to Regime 1, possibly reflecting an increased tendency of commercial and investment bankers to exhibit a similar "preferred habitat." Nevertheless, the modal density is still small compared to IPOs. Finally, similar to IPOs and SEOs, the density mass below the mode was greater in Regime 1 than either Regimes 2 or 3.

The results of Table 6 support the hypothesis that as competition has increased, underwriting spreads have decreased for all three securities we analyzed, namely, IPOs, SEOs, and debt. However, the decline in underwriting spreads is strongest when we compare Regime 2 over Regime 1.

VI. The Effect of Control Variables on Underwriting Spreads across the Three Regimes

To examine whether the above decline was associated with changing underwriter and issuer characteristics, we estimated the IPO, SEO, and debt regression models for each regime. We then undertake a Chow test on the hypothesis that the regression coefficients in Regime 1 are jointly different from the regression coefficients in Regime 2. A similar analysis is undertaken between Regime 2 and Regime 3. We then analyze the differential impact of each issuer and underwriter variable of interest on spreads.

A. IPOs

Table 7 provides the results for IPOs. In column 1 we present results from a regression of spreads on the independent variables for Regime 1. The regression does not include the COMMERCIAL_BANK dummy because during this time period commercial banks were not allowed to underwrite IPOs, either directly or indirectly, through a Section 20 subsidiary. In column 2 (column 3) of Table 7 we present the regression of IPO spreads on our independent variables for Regime 2 (Regime 3). In the latter two regimes, we include COMMERCIAL_BANK in our list of independent variables. We find that in Regime 2, spreads of IPOs underwritten by commercial banks were lower than spreads of IPOs underwritten by investment banks by −0.57%. This effect was lower in Regime 3 (−0.15%).

In all three regimes we find a significant negative effect between REPUTATION and underwriting spreads, with a greater negative effect in Regime 1 compared to Regimes 2 and 3. However, we find little evidence that better quality issuers could lower their spreads relative to lower quality issuers after commercial banks entered the underwriting market. Specifically, we find no significant differences across the three regimes of the impact of PROFITS and DEBT on underwriting spreads.

When we examine issuer risk (VOLATILITY) we find that higher risk issuers were charged higher spreads in all three regimes, with the lowest impact in Regime 3. Interestingly, while we find evidence of economies of scale in Regimes 1 and 2, the evidence suggests diseconomies of scale in Regime 3. This may reflect limits to economies of scale in underwriting. The impact of the underwriter's star analyst on underwriting spreads is similarly negative in Regimes 1 and 2, although this negative effect is lower in Regime 3. The negative relationship between NUMBER_OF_ISSUES and underwriting spreads for IPOs is significant in Regime 1 but not in Regimes 2 and 3. We also find that technology issuers significantly reduced spreads in Regime 2, although this effect is not present in Regimes 1 and 3. The negative relationship between the technology dummy in the full 30-year sample period may be driven by the growth in new industry firms, which

TABLE 7

Regressions of Underwriting Spreads for IPOs and Differences in Each Regime

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 30-year period from 1975 through 2004 and are obtained from the U.S. Public New Issues Database of the Securities and Data Company. Regime 1 is defined as 1975–1989, Regime 2 is defined as 1990–1998, and Regime 3 is defined as 1999–2004. All variables are defined in the text and the Appendix, and all standard errors are corrected for heteroscedasticity using the White correction. In the last two columns, we present the *t*-statistics for the difference in coefficients test.

Panel A. Regressions

				t-Statistics for Difference in Coefficients[a] of Regimes:	
	Regime 1	Regime 2	Regime 3	2–1	3–2
INTERCEPT	8.259***	7.181***	6.902***	−6.49***	−1.63
	(69.80)	(61.56)	(54.82)		
COMMERCIAL_BANK	—	−0.569***	−0.145**	—	3.33***
		(−5.09)	(−2.39)		
REPUTATION	−0.115***	−0.038***	−0.025***	9.04***	3.44***
	(−14.06)	(−15.90)	(−8.54)		
PROFIT	−0.215**	−0.077	0.002	1.19	1.10
	(−2.21)	(−1.21)	(0.06)		
DEBT	0.062	−0.027	0.000	−0.96	0.81
	(0.72)	(−0.81)	(0.02)		
MISSING_FINANCIAL	0.355***	0.048	−0.528***	−2.81***	−5.27***
	(4.10)	(0.72)	(−6.10)		
VOLATILITY	15.336***	17.935***	8.533***	1.17	−4.60***
	(8.84)	(12.79)	(5.75)		
MISSING_VOLATILITY	0.810***	1.212***	0.694***	3.52***	−4.01***
	(9.92)	(15.22)	(6.81)		
INVERSE_OF_ISSUE_SIZE	0.681***	0.717***	−1.194***	0.19	−5.92***
	(6.31)	(4.53)	(−4.24)		
STAR_ANALYST	−0.801***	−0.821***	−0.361***	−0.37	6.25***
	(−17.40)	(−28.62)	(−5.33)		
NUMBER_OF_ISSUES	−0.075***	−0.004	0.001	4.54***	0.14
	(−7.03)	(−0.35)	(0.03)		
TCU	−0.257***	−0.142**	−0.119*	1.17	0.24
	(−3.37)	(−2.28)	(−1.65)		
FIR	−0.658***	−0.570***	−0.749***	1.09	−1.61
	(−11.44)	(−10.05)	(−7.83)		
TECHNOLOGY	0.049	−0.210*	−0.061	−4.06***	2.17***
	(1.00)	(−5.13)	(−1.11)		
Adjusted R^2	0.389	0.359	0.424		

Panel B. Chow Tests

	F-Statistics	*p*-Value
Chow test that the coefficients of Regime 1 are different from Regime 2	44.192	0.000***
Chow test that the coefficients of Regime 2 are different from Regime 3	36.179	0.000***

***, **, and * indicate statistically significant at the 1%, 5%, and 10% levels, respectively.

[a] *t*-statistics for differences in coefficients are calculated as $\frac{\beta_2 - \beta_1}{\sqrt{SE(\beta_1)^2 + SE(\beta_2)^2}}$.

overlaps, in part, with the end of Regime 2. Finally, when we examine the Chow statistics, we find that the regression coefficients in Regime 1 are jointly different from the regression coefficients in Regime 2. In addition the Chow test suggests that the differences between the regression coefficients for Regimes 2 and 3 were also jointly significant. Thus, the joint effect of the independent variables on IPO underwriting spreads has changed significantly over the last 30 years.

B. SEOs

Table 8 presents the results for SEOs. We find that spreads of SEOs underwritten by commercial banks were lower than spreads of SEOs underwritten

by investment banks in both Regimes 2 and 3. However, the difference is statistically insignificant. In all three regimes we find a significant negative relationship between REPUTATION and underwriting spreads, with the greatest negative effect in Regime 1, followed by Regimes 3 and 2.

We find some evidence that better quality SEO issuers have managed to lower their spreads across the three regimes, although the evidence is not very strong. Specifically, for PROFITS there are no significant differences between Regimes 1 and 2, with Regime 3 having the greatest negative impact. With respect to the impact of DEBT on underwriting spreads, we find issuers with higher debt levels in Regime 1 to have the highest spreads, and this impact is statistically

TABLE 8

Regressions of Underwriting Spreads for SEOs and Differences in Each Regime

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 30-year period from 1975 through 2004 and are obtained from the U.S. Public New Issues Database of the Securities and Data Company. Regime 1 is defined as 1975–1989, Regime 2 as 1990–1998, and Regime 3 as 1999–2004. All variables are defined in the text and the Appendix and all standard errors are corrected for heteroscedasticity using the White correction. In the last two columns, we present the *t*-statistics for the difference in coefficients test.

Panel A. Regressions

				t-Statistics for Difference in Coefficients[a] of Regimes:	
	Regime 1	Regime 2	Regime 3	2–1	3–2
INTERCEPT	3.908***	4.384***	6.175***	2.07**	5.63***
	(21.95)	(30.21)	(21.82)		
COMMERCIAL_BANK	—	−0.278***	−0.172*	—	0.82
		(−3.59)	(−1.67)		
REPUTATION	−0.079***	−0.047***	−0.057***	3.82***	10.98***
	(−13.69)	(−7.75)	(−7.84)		
PROFIT	−0.512***	−0.385**	−0.717***	0.51	−1.89*
	(−2.61)	(−2.57)	(−7.89)		
DEBT	0.309*	−0.097	−0.179***	−2.22**	−0.90
	(1.79)	(−1.60)	(−2.64)		
MISSING_FINANCIAL	0.284**	0.015	0.013	−1.57	−0.01
	(2.13)	(0.14)	(0.10)		
VOLATILITY	65.398***	31.931***	10.980***	−8.23***	−7.31***
	(20.06)	(13.13)	(7.25)		
MISSING_VOLATILITY	3.147***	2.737***	1.609***	−1.07	−2.50**
	(15.13)	(8.53)	(5.05)		
INVERSE_OF_ISSUE_SIZE	5.944***	6.158**	−1.029***	0.07	−2.49**
	(4.97)	(2.14)	(−4.80)		
MARKET_VALUE/ISSUE_SIZE	−1.903***	−0.350***	−0.009**	2.82***	2.81***
	(−3.54)	(−2.89)	(−2.44)		
STAR_ANALYST	−0.206***	−0.241***	−0.208**	−0.41	0.28
	(−3.61)	(−3.87)	(−2.12)		
NUMBER_OF_ISSUES	−0.021	0.002	−0.337***	0.81	−4.37***
	(−1.54)	(0.08)	(−4.59)		
TCU	−0.445***	−0.377***	−0.604***	0.65	−2.08**
	(−5.48)	(−5.73)	(−6.92)		
FIR	−0.079	−0.247***	0.058	−1.27	2.26**
	(−0.81)	(−2.78)	(0.57)		
TECHNOLOGY	0.011	0.021	0.082	0.10	0.70
	(0.13)	(0.39)	(1.20)		
Adjusted R^2	0.513	0.462	0.256		

Panel B. Chow Tests

	F-Statistics	*p*-Value
Chow test that the coefficients of Regime 1 are different from Regime 2	30.516	0.000***
Chow test that the coefficients of Regime 2 are different from Regime 3	39.412	0.000***

***, **, and * indicate statistically significant at the 1%, 5%, and 10% levels, respectively.

[a] *t*-statistics for differences in coefficients are calculated as $\frac{\beta_2 - \beta_1}{\sqrt{SE(\beta_1)^2 + SE(\beta_2)^2}}$.

significantly different from the impact of DEBT in Regimes 2 and 3. When we examine issuer risk (VOLATILITY) we find that higher-risk issuers were charged higher spreads in all three regimes, with VOLATILITY having the highest impact in Regime 1.

Similar to our findings for IPOs, we find evidence of economies of scale in Regimes 1 and 2, with diseconomies of scale in Regime 3. The impact of STAR_ANALYST on underwriting spreads is significantly negative in all regimes. We also find that transportation, communication, and utility SEO issuers are charged lower spreads, and this effect is largest in Regime 3. Depository and nondepository financial companies, insurance, and real estate SEO issuers were found to be charged lower spreads in Regime 2. Examining the Chow statistics, we find that the regression coefficients in Regime 1 are jointly different from the regression coefficients in Regime 2, as are the differences in regression coefficients between Regimes 2 and 3. Thus, as for IPOs, the joint effect of the independent variables on SEO underwriting spreads has changed significantly over the last 30 years.

C. Debt

Table 9 presents our results for debt. We find that spreads of debt issues underwritten by commercial banks were lower than spreads of debt issues underwritten by investment banks in both Regimes 2 and 3, with statistically insignificant differences between Regimes 2 and 3. We only find a significant negative effect between REPUTATION and underwriting spreads in Regime 2.

We find little evidence that better quality debt issuers have managed to lower their spreads more than lower quality issuers in recent regimes. Specifically, for the impact of PROFITS on underwriting spreads, we find Regime 1 to have had a significantly greater negative effect on underwriting spreads relative to Regimes 2 and 3. For the impact of DEBT on underwriting spreads, we find issuers with higher debt levels in Regime 1 to have had a similar impact on spreads as those in Regime 2. Investment grade rated issuers reduced their underwriting spreads in Regime 1, and this effect is significantly different from Regimes 2 and 3. This is in direct contrast to the hypotheses that better quality debt issuers lower their spreads to a greater extent in more competitive debt underwriting markets. Similarly, low-risk debt issuers do not have the greatest reduction in their spreads in the more competitive markets.

We find evidence of economies of scale for debt issues in Regimes 1 and 2, but no economies of scale in Regime 3. The impact of having a star analyst on underwriting spreads is negative in all three regimes. We also find that depository and nondepository financial companies, insurance, and real estate SEO issuers were charged the lowest spreads in Regime 2. On examining the Chow statistics, we find that the regression coefficients in Regime 1 are jointly different from the regression coefficients in Regime 2, as are the differences in regression coefficients between Regimes 2 and 3. Thus, as for equities, the joint effect of the independent variables on debt underwriting spreads has changed significantly over the last 30 years.

TABLE 9

Regressions of Underwriting Spreads for Debt and Differences in Each Regime

Underwriting spreads are gross spreads defined as the difference between the offered amount and the proceeds to the issuer, expressed as the percentage of the offered amount (or issue size) (see Gande, Puri, and Saunders (1999)). Spreads are for the 30-year period from 1975 through 2004 and are obtained from the U.S. Public New Issues Database of the Securities and Data Company. Regime 1 is defined as 1975–1988, Regime 2 as 1989–1998, and Regime 3 as 1999–2004. All variables are defined in the text and the Appendix, and all standard errors are corrected for heteroscedasticity using the White correction. In the last two columns, we present the *t*-statistics for the difference in coefficients test.

Panel A. Regressions

				t-Statistics for Difference in *t*-Coefficients[a] of Regimes:	
	Regime 1	Regime 2	Regime 3	2–1	3–2
INTERCEPT	2.094***	1.274***	1.798***	−2.05**	1.27
	(6.56)	(5.31)	(5.38)		
COMMERCIAL_BANK	—	−0.115***	−0.104***	—	0.21
		(−2.75)	(−3.43)		
REPUTATION	−0.002	−0.011***	0.001	−2.68***	4.72***
	(−0.72)	(−5.81)	(0.59)		
PROFIT	−0.039	−0.461**	−0.041	−0.81	1.33
	(−0.08)	(−2.52)	(−0.16)		
DEBT	0.214	0.203***	−0.017	−0.06	−1.74*
	(1.17)	(2.96)	(−0.16)		
MISSING_FINANCIAL	0.106	0.040	0.018	−0.40	−0.21
	(0.69)	(0.68)	(0.21)		
INVESTMENT_GRADE	−1.919***	−0.922***	−0.831***	7.52***	1.32
	(−15.15)	(−23.51)	(−14.69)		
VOLATILITY	6.776	24.588***	0.856	3.73***	−9.55***
	(1.54)	(13.20)	(0.52)		
MISSING_VOLATILITY	0.710**	1.092***	−0.232	1.27	−6.89***
	(2.53)	(9.97)	(−1.47)		
INVERSE_OF_ISSUE SIZE	48.309***	25.572***	0.012	−2.30**	−7.85***
	(5.17)	(7.86)	(0.11)		
MARKET_VALUE/ISSUE_SIZE	−0.001	−0.001***	0.000	0.00	3.85***
	(−0.87)	(−3.85)	(0.13)		
STAR_ANALYST	−0.068	−0.072***	−0.037	−0.08	1.00
	(−1.60)	(−2.73)	(−1.61)		
NUMBER_OF_ISSUES	0.020	0.005*	0.017*	−0.93	1.25
	(1.26)	(1.83)	(1.85)		
TCU	0.034	0.030	0.048*	−0.05	0.46
	(0.43)	(1.12)	(1.70)		
FIR	−0.162**	−0.305***	−0.100***	−1.76*	4.44***
	(−2.14)	(−10.40)	(−2.80)		
TECHNOLOGY	−0.082	0.033	−0.040	1.49	−1.17
	(−1.22)	(0.86)	(−0.81)		
LMAT	1.283**	−0.225***	0.023	−2.75***	4.67***
	(2.35)	(−5.55)	(0.67)		
HMAT	0.206***	0.173***	0.419***	−0.69	3.31***
	(4.56)	(10.47)	(5.79)		
CALLABLE	−0.605***	−0.258***	−0.127***	1.80*	2.87***
	(−3.18)	(−8.06)	(−3.91)		
TBILL	−0.040	0.064**	−0.062*	1.49	−2.62***
	(−0.64)	(2.04)	(−1.70)		
INTER	0.248	−0.081	0.071	−1.83*	1.26
	(1.53)	(−1.03)	(0.78)		
LONG	−0.194	0.016	−0.105	1.52	−0.90
	(−1.62)	(0.23)	(−0.91)		
Adjusted R^2	0.774	0.639	0.338		

Panel B. Chow Tests

	F-Stat.	*p*-Value
Chow test that the coefficients of Regime 1 are different from Regime 2	26.292	0.000***
Chow test that the coefficients of Regime 2 are different from Regime 3	46.209	0.000***

***, **, and * indicate statistically significant at the 1%, 5%, and 10% levels, respectively.

[a] *t*-statistics for differences in coefficients are calculated as $\frac{\beta_2 - \beta_1}{\sqrt{se(\beta_1)^2 + se(\beta_2)^2}}$.

VII. Robustness Test

A. IPOs

For robustness we conduct an additional test, beginning with IPOs. We use the regression coefficients obtained from a regression of underwriting spreads on the independent variables in Regime 1 to predict Regime 2 underwriting spreads (using the data on the independent variables in Regime 2). For ease of exposition, call the derived estimate of underwriting spreads "predicted" spreads. We then compare the actual spreads in Regime 2 with the predicted spreads in Regime 2. A similar analysis is undertaken between Regimes 3 and 1. We find mean predicted spreads in Regime 2 to be 8.03%, which is statistically significantly higher than the mean actual spreads of 7.45% (p-value = 0.001). A Mann-Whitney rank sum test for differences in medians between actual and predicted underwriting spreads is also strongly statistically significant (p-value = 0.001). When we compare Regimes 3 and 1, we find mean predicted spreads in Regime 3 to be 7.40% which is statistically significantly higher than the actual spreads of 6.59% (p-value = 0.001). A Mann-Whitney rank sum test for differences in medians shows similar results (p-value = 0.001). These results confirm that IPO underwriting spreads have fallen in Regimes 2 and 3 versus Regime 1.

B. SEOs

We repeat the above test for SEOs. We find mean predicted spreads in Regime 2 to be 5.62%, which is statistically significantly higher than the mean actual or realized spreads of 5.08% (p-value = 0.001). A Mann-Whitney rank sum test for differences in medians between actual and predicted underwriting spreads is again strongly statistically significant (p-value = 0.001). When we compare Regimes 3 and 1, we find mean predicted spreads in Regime 3 to be 5.49% which is statistically significantly higher than the actual spreads of 4.59% (p-value = 0.001), a result also confirmed by the Mann-Whitney rank sum test for differences in medians (p-value = 0.001). These results are further evidence that underwriting spreads have fallen in Regimes 2 and 3 versus Regime 1 for SEOs.

C. Debt

In the case of debt, we find mean predicted spreads in Regime 2 to be 0.93%, which is statistically significantly higher than the mean actual or realized spreads of 0.76% (p-value = 0.001), which is confirmed by the Mann-Whitney rank sum test for differences in medians (p-value = 0.001). When we compare Regimes 3 and 1, we find mean predicted spreads in Regime 3 to be 0.56%, which is statistically significantly higher than the actual spreads of 0.46% (p-value = 0.001) and is again confirmed by the Mann-Whitney rank sum test for differences in medians (p-value = 0.001). These results confirm that underwriting spreads were also lower in Regimes 2 and 3 versus Regime 1 for debt issues.

In summary, the above tests confirm that underwriting spreads have fallen over time, especially during the commercial bank competitive regime vis-à-vis the no-commercial bank entry regime, for both debt and equity issues.

VIII. Conclusions

The phasing out of the historic separation of commercial banking from investment banking has allowed commercial banks to participate in the market for underwriting issues. This paper examines whether the entry of commercial banks, acting as underwriters, has had a procompetitive effect on underwriting spreads over a 30-year period that comprises regimes of no bank competition, restricted bank competition, and full bank competition.

We find that, on average, entering banks have charged lower underwriting spreads of approximately 72 basis points for IPOs, 43 basis points for SEOs, and 14 basis points for debt over the entire sample period. We also find the least competitive underwriting market (Regime 1, when no commercial banks were allowed to enter as underwriters) to have the highest underwriting spreads, followed by the restricted and full competitive underwriting markets (Regimes 2 and 3, when commercial banks were allowed to underwrite either through Section 20 subsidiaries or directly). The economic magnitude of lower underwriting spreads is most evident for the bank competitive Regimes 2 and 3, relative to the no-bank competitive Regime 1, with Regimes 2 and 3 generally having similar underwriting spreads. These results are robust to the inclusion of a large number of control variables and across IPOs, SEOs, and debt issues. Overall, the results are consistent with the view that commercial banks have had a procompetitive effect in reducing underwriting spreads. With respect to the other control variables, we find that their effects have differed across the three regimes and thus across the past 30 years. Indeed, Chow tests reject the equality of the independent variables across all three regimes and across all three security types.

APPENDIX

Definitions of Independent Variables Used in Regressions

Variables	Definitions
COMMERCIAL_BANK	A dummy set to unity if the issuer's investment bank was a Section 20 subsidiary of a commercial bank between 1990 and 2000, and a subsidiary of a commercial bank after 2000.
REPUTATION	Total percentage market share ownership of the lead managers in the year of the issue (Gande, Puri, and Saunders (1999), Aggarwal, Prabhala, and Puri (2002)).
PROFIT	Percentage of operating income before depreciation to assets (Hansen (2001)), and set to zero if missing.
DEBT	Percentage of total debt to assets (Hansen (2001)), and set to zero if missing.
MISSING_FINANCIAL	Set to unity if the above two financial statement variables are unavailable for issuer firms, and zero otherwise.
INVESTMENT_GRADE	A dummy set to unity if the firm has a Moody's investment debt rating of Aaa through Baa, and zero otherwise.
VOLATILITY	Standard deviation of daily stock returns in the year after issue (Hansen (2001)).
MISSING_VOLATILITY	Set to unity if unable to calculate the standard deviation of stock returns due to missing data, and zero otherwise.
INVERSE_OF_ISSUE_SIZE	Defined as the inverse of the 2004 inflation adjusted dollar value of issue size (Altinkilic and Hansen (2000)).

(*continued on next page*)

APPENDIX (continued)

Definitions of Independent Variables Used in Regressions

Variables	Definitions
MARKET_VALUE/ISSUE_SIZE	Market value of the firm divided by issue size.
STAR_ANALYST	A dummy set to unity if the underwriting firm employed a star analyst listed by Institutional Investor's All American Research Team, and zero otherwise (Mola and Loughran (2004)).
NUMBER_OF_ISSUES	The total number of issues in that year, for IPOs, SEOs, and debt individually.
TCU	A dummy set to unity if the issuer belonged to an industry whose one-digit SIC code started with 4, and zero otherwise.
FIR	A dummy set to unity if the issuer belonged to an industry whose one-digit SIC code started with 6, and zero otherwise.
TECHNOLOGY	A dummy set to unity if the issuer's SIC code was equal to 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7378, or 7379, and zero otherwise (Loughran and Ritter (2002), Mola and Loughran (2004)).
LMAT	A dummy set to unity if debt issue has maturity of less than five years, and zero otherwise.
HMAT	A dummy set to unity if debt issue has maturity of greater than 15 years, and zero otherwise.
CALLABLE	A dummy set to unity if the debt issue is a callable bond, and zero otherwise.
TBILL	The one-month lagged values of the monthly returns on one-year government bonds.
INTER	The one-month lagged values of the monthly returns on five-year government bonds.
LONG	The one-month lagged values of the monthly returns on 20-year government bonds.

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