To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?

Kedar S. Kulkarni
Duquesne Capital Management LLC
40 W. 57th Street; 25th Floor
New York NY 10019
kedar@duquesne.com

Tarun Sabarwal**
Department of Economics, Box 1208
Washington University in St. Louis
One Brookings Drive
St. Louis MO 63130-4899
sabarwal@wustl.edu

Paper citation:
Kulkarni, Kedar and Tarun Sabarwal (2007): "To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?" *Annals of Finance*, 3(3), July, 297-327.

Keywords:
Investment Banking; Initial Public Offering; Differentiating Factors; Concentration; 7 percent puzzle

Abstract:
One explanation provided for the relatively high and increasingly stable spreads for moderate-sized IPOs ($20-$80 million) documented in Chen and Ritter (2000) is that issuing firms focus less on price and more on a combination of investment bank-differentiating factors (such as underwriter prestige, analyst coverage, industry expertise, under-pricing, price stabilization activities, liquidity provision, and so on,) and banks use industry-based differentiation as a source of market power. Using a new approach developed in a model of firm location choice due to Ellison and Glaeser (1997), this paper presents some evidence on the combined relevance of such bank-differentiating factors, over and above bank size, for firms choosing investment banks for floating IPOs. For moderate-sized IPOs, there is a little, but not much evidence that such factors are a good explanation for high and increasingly stable spreads. Other than in a few of the largest industries, bank-differentiating factors are not significantly relevant for a large proportion of industries. Moreover, one aggregate measure of differentiation is declining over time.

To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?*

Kedar S. Kulkarni
Duquesne Capital Management LLC
40 W. 57th Street; 25th Floor
New York NY 10019
kedar@duquesne.com

Tarun Sabarwal**
Department of Economics, Box 1208
Washington University in St. Louis
One Brookings Drive
St. Louis MO 63130-4899
sabarwal@wustl.edu

First Draft: May 2004
This version: June 7, 2006

JEL Numbers: G24, G31, L11
Keywords: Investment Banking, Initial Public Offering, Differentiating Factors, Seven Percent Puzzle

* We are grateful to Preston McAfee for suggesting this approach to the problem, to Jay Ritter for providing an updated list of IPOs, and to Robert Anderson and anonymous referees for helpful comments. We are grateful to seminar audiences at the University of Texas at Austin and Macalester College for helpful comments.
** Corresponding author

To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?

Abstract

One explanation provided for the relatively high and increasingly stable spreads for moderate-sized IPOs ($20-$80 million) documented in Chen and Ritter (2000) is that issuing firms focus less on price and more on a combination of investment bank-differentiating factors (such as underwriter prestige, analyst coverage, industry expertise, under-pricing, price stabilization activities, liquidity provision, and so on,) and banks use industry-based differentiation as a source of market power. Using a new approach developed in a model of firm location choice due to Ellison and Glaeser (1997), this paper presents some evidence on the combined relevance of such bank-differentiating factors, over and above bank size, for firms choosing investment banks for floating IPOs. For moderate-sized IPOs, there is a little, but not much evidence that such factors are a good explanation for high and increasingly stable spreads. Other than in a few of the largest industries, bank-differentiating factors are not significantly relevant for a large proportion of industries. Moreover, one aggregate measure of differentiation is declining over time.

1. Introduction

As shown in the well-known paper by Chen and Ritter (2000), in the market for initial public offerings (IPOs), the moderate-sized IPO market (IPOs in the range $20-$80 million) has high and increasingly stable prices – with gross spreads of about 7 percent of IPO proceeds.[1] This is in contrast to differential and significantly lower pricing observed both in IPO markets in other countries and in markets for seasoned equity offerings (SEOs), whether in the U.S. or abroad.

One of the several explanations postulated for this "seven percent puzzle" is that issuing firms may focus less on price and more on some combination of investment bank-differentiating factors, (such as underwriter prestige, analyst coverage, industry expertise, under-pricing, price stabilization activities, liquidity provision, and so on,) and investment banks use industry-based differentiation as a source of market power.

Earlier work has presented some evidence regarding this explanation. For example, Krigman, Shaw, and Womack (2001)[2] find that in the decision of firms to switch from their IPO-underwriter to a different SEO-underwriter, IPO-underwriting fees charged are

[1] As they show, during the period 1995-1998, about 91 percent of firms floating IPOs between 20 and 80 million dollars paid a gross spread of exactly 7 percent to raise this capital. Moreover, the use of this 7 percent spread has increased over time; from 26 percent of all moderate-sized IPOs in 1985-87, to 75 percent in 1988-94, to 91 percent in 1995-98, and more recently, to 96 percent in 1999-03.

[2] They look at 572 firms with initial public offerings during 1993-95 that returned for a seasoned equity offering in the next three years, and 180 of which switched underwriters, and on surveys of decision-makers (CFOs and CEOs) of 62 of these switching firms. Their focus is slightly different, in that they consider reasons for firms to switch underwriters for a SEO. Of course, an important distinction between the IPO and SEO decision is that the SEO firm has a history of securities market evaluation of its prospects, and therefore, the uncertainty regarding its prospects is different from that of an IPO firm. Consequently, firm decisions in each case are potentially different. Moreover, the data here cover a different time period, 1985-2003, the analysis focuses on moderate-sized IPOs, and the analysis does not use surveys.

accorded low relevance, whereas graduating to an underwriter with higher prestige and with better analyst coverage are accorded high relevance. Moreover, Benveniste, Ljungqvist, Wilhelm, and Yu (2003) show that IPO terms and the decision of IPO-issuing firms to carry through with an offering are conditioned on the experience of their primary market contemporaries. Furthermore, Logue, Rogalski, Seward, and Foster-Johnson (2002) find that underwriter reputation is a significant determinant of pre-market underwriter activities, is weakly related to after-market price stabilization activities, and is unrelated to issuer returns. Additional evidence for the role of underwriter reputation and industry-specific spillovers is provided in, among others, Beatty and Ritter (1986), Carter and Manaster (1990), Chemmanur and Fulghieri (1994), Carter, Dark and Singh (1998), Dunbar (2000), Benveniste, Busaba, and Wilhelm (2002), and Lowry and Schwert (2002).

Using a new approach developed in a relatively recent model of firm location choice due to Ellison and Glaeser (1997),[3] this paper conducts a new test of the extent to which this explanation holds in the data.[4]

Intuitively, the test proposed by Ellison and Glaeser (henceforth, EG) can be motivated by a simple example, as follows. Suppose there are two investment banks (indexed 1 and

[3] Their model is applied here as a discrete-choice model of a firm's optimal choice of an investment bank. Notably, the model focuses on firm decision-making, and does not model investment bank decision-making explicitly. Details are provided below.

[4] In particular, this paper does not investigate the question of implicit or explicit collusion. For references to that strain of the literature, confer Chen and Ritter (2000), which uses arguments from Chen (1998), Dutta and Madhavan (1997), Rotember and Saloner (1986), and from Bhagat and Frost (1986), Booth and Smith (1986), and other papers, including Ljunqvist and Wilhelm, Jr. (1999), Hansen (2001), Christie and Schulz (1994), Christie, Harris, and Schulz (1994). A recent survey of under-pricing, share allocation, and overall IPO activity is presented in Ritter and Welch (2002).

2), each with one-half the market share of all IPOs, and suppose IPOs are floated by firms in two industries (indexed A and B), each contributing one-half of value of all IPOs. If bank 1 possesses or provides a combination of differentiating factors that are relatively more valuable for firms in industry A, then a greater proportion of industry A firms optimally choose (or cluster with) bank 1. Similarly, if bank 2 possesses or provides a combination of factors that are relatively more valuable for firms in industry B, then a greater proportion of industry B firms optimally choose (or cluster with) bank 2. Suppose firm choices imply the following outcome: four-fifths of IPO value of industry A goes to bank 1, and one-fifth to bank 2, and symmetrically for industry B. In this example, the observed difference between a bank's share of an industry (four-fifths or one-fifth) and a bank's share of all IPOs (one-half) arises from relevance of bank-differentiating factors. In other words, if banks provide a combination of differentiating factors, then observed firm clustering with banks would be related to the extent such combinations of factors are valuable for firm choices.

Using EG's discrete-choice model, differential clustering of firms with banks is generated by two parameters that are viewed in terms of two broad categories of bank-differentiating factors – industry-specific information spillovers and bank-specific reputation factors, such as underwriter prestige.[5] For each industry, the stronger is the

[5] Intuitively, the parameter for industry-specific factors is a reduced form index of relevance of factors related to industry-specific information spillovers, such as better investment bank placements of IPO shares (whether through book-building, under-pricing, or share allocation) depending on number of industry deals done, more expert analyst coverage depending on number of industry deals done, economies of scope in information production costs (including lower marketing costs and better post-IPO stock liquidity) depending on number of industry deals done, and so on. Similarly, the parameter for bank-specific factors is a reduced form index of relevance of factors related to underwriter prestige. That is, firms in a particular industry might choose an investment bank partly because of its reputation, indicating better bank placement

relevance of these parameters, the greater is clustering of this industry's firms with particular banks.

Notice that some clustering of firms with banks can occur randomly as well, and therefore, EG's test of differential clustering takes as a benchmark the outcome that would occur if firms choose banks randomly. This benchmark assumes that in the absence of relevance of bank-differentiating factors, the expected probability that a firm chooses a particular bank is the bank's market share. (Intuitively, in the absence of relevance of bank-differentiating factors, firms choose banks as if by throwing darts randomly at a map of all banks, with size of a bank given by its market share.[6]) EG's results provide industry-level tests for when observed clustering is different from benchmark, and this test is used here to determine existence of relevance of bank-differentiating factors for each industry.

Based on observed clustering, EG's results derive a measure of the strength of a combination of these two parameters. This measure is termed a differentiation index. It takes a value between 0 and 1, (with higher parameter values implying greater index value,) it is comparable across industries, across segments of the IPO market, and across time.

---

of IPO shares depending on underwriter reputation, an overall reputation for better analysts or greater analyst coverage, a reputation for price stabilization activities or for liquidity, and so on.

[6] A *caveat* to this benchmark is that bank size might be positively related to underwriter prestige. (This is not always the case. For example, Chen and Ritter (2000) document existence of small niche investment banks in other parts of this market.) To the extent that this is the case, the test here provides for relevance of investment bank-differentiating factors over and above bank size. In this sense, the test here is a stricter test for relevance of bank-differentiating factors.

An important limitation of this model is that it cannot provide measures of direct effects of specific bank-differentiating factors. Indeed, (as can be seen in the section describing the model,) the differentiation index is invariant to particular compositional changes; that is, it is observationally equivalent to particular changes in the two parametric components of differentiation. Therefore, this work cannot address the role of specific bank-differentiating factors.

The analysis here can (and does) inquire into the broader question of relevance of the hypothesized bank-provided industry-based differentiation, *regardless of the form it may take*, for firms choosing investment banks to float IPOs. Therefore, while this work cannot address the relevance of specific bank-differentiating factors such as the specific role of greater analyst coverage, or of star analysts, or of bank prestige, or of industry expertise, it can (and does) address the broader question of whether observed firm choices are consistent with the view that firms in an industry find value in some combination of a bundle of bank-differentiating factors. This broader test can serve a useful purpose, because different bank-differentiating factors can potentially interact with each other. For example, suppose firms in an industry treat a bank's industry expertise and a bank's prestige as close substitutes, (perhaps because each factor independently allows a firm's IPO to be placed on attractive terms,) and value these equally. In this case, if one bank provides industry expertise but not prestige, and another bank provides prestige but not industry expertise, then even though each bank is providing "differentiated" services, neither has significant market power, because products of both banks are close substitutes, and we would not expect to observe "high" prices based on

market power. More generally, the test here allows for a combination of differentiating factors to influence firm profits and firm choice.

An appealing feature of EG's work is that the differentiation index is a "model-based" index, and it yields a testable prediction directly from the model. A secondary advantage of this model is that it side-steps some limitations of empirical measurement. For example, it may be hard to measure (and consequently, to separately identify the role of) the different bank-differentiating factors mentioned above.[7] Moreover, several factors mentioned above can influence the role of both underwriter prestige and industry expertise, and therefore, empirically, it may be hard to separate the specific contribution of a given factor on either parameter. These potential limitations are side-stepped here, because the analysis here represents only a combined effect of these two parameters.

The dataset used here is derived from SDC data for 1985-2003, and it is bench-marked to updates to data in Chen and Ritter (2000). Experiments are conducted at the level of four-digit SIC codes (SIC4), three-digit SIC codes (SIC3), two-digit SIC Codes (SIC2), and some alternative sub-samples. Within these classifications, experiments are conducted for the overall period (1985-03), for three sub-periods used in Chen and Ritter (2000) – 1985-87, 1988-94, 1995-98 – and for the fourth more recent period 1999-03.

To investigate the explanation that Chen and Ritter's results for moderate-sized IPOs are consistent with explanations based on investment bank-differentiating factors, the

[7] For example, confer Krigman, Shaw, and Womack (2001) for some issues that arise in inferring high-quality underwriting firms.

primary hypothesis here is that for moderate-sized IPOs, bank-differentiating factors are relevant for firms choosing banks to underwrite IPOs. This is an existence hypothesis, and it can be viewed as follows. Suppose firms issuing moderate-sized IPOs focus less on price and more on investment bank-differentiating factors, and investment banks use industry-based differentiation as a source of market power. If firms in an industry perceive investment banks as differentiated, and if firms value such bank-differentiating factors more than raw bank size, then firms in this industry would cluster with (or choose) banks differently from benchmark. There is a little, but not much evidence for this *existence of differentiation* hypothesis.

For moderate-sized IPOs issued during 1985-2003, in the base case (SIC4 industries), about 12 percent (36 of 300) of the industries exhibit existence of differentiation. Moreover, there is no clear pattern that if differentiation exists for an industry then it necessarily exists for industries with similar SIC codes, or if differentiation exists for an industry in one period then it necessarily exists in other periods as well. Experiments to control for the effect of distribution of industries on test results yield a number of about 25 percent (24 percent at the median, and 26 percent at the mean). These experiments show that except for a handful of the very largest industries, the probability of existence of differentiation remains small. When considering a non-outlier sub-sample, differentiation exists in about 16 percent of the industries. When considering SIC3 industries, differentiation exists in about 13 percent of industries, and when considering SIC2 industries, differentiation exists in about 24 percent of industries. Results for the

sub-periods are similar, and are more likely to yield lower numbers. The high frequency of technology IPOs during 1998-2000 does not appear to affect these results.

Industries that exhibit differentiation appear to be diffused across the space of SIC codes, and include established industries, newer industries, and a mixture of the two. An aggregate measure of differentiation is declining over time, independent of SIC4, SIC3, or SIC2 classification. Therefore, one may conjecture that over time, on average, the moderate-sized IPO segment is moving toward less differentiation.

The paper proceeds as follows. Section 2 describes an application of the Ellison-Glaeser model to this paper. Section 3 describes the data and presents the results. Section 4 concludes.

2. Model

The discrete-choice model of firm choice of investment bank used here is due to EG.[8] Their model was formulated to understand clustering of manufacturing industries in different geographic areas, over and above clustering of overall manufacturing. In their model, profit-maximizing firms in an industry choose among different geographic areas (states) in which to locate. Differential clustering is generated by state-specific factors, thought of as natural advantages from locating in a particular state (for example, good weather in California provides a natural advantage for wine production in California, coastal location of Virginia provides a natural advantage for ship-building in Virginia),

[8] This section draws heavily on Ellison and Glaeser (1997). Interested readers can yield additional insights about their model, and consequently, its application here, by referring to their lucid and wonderfully intuitive exposition.

and spillover factors, thought of as spillovers from location of other firms (for example, technological spillovers and labor market gains from computer firms in Silicon Valley, or car manufacturers in Detroit).

Their model and results are recast for the situation analyzed here. To facilitate reference to their model, same notation is used here, with minor exceptions. Moreover, direct comparisons of the application here and the application in EG are provided as well.

Suppose, similar to EG, there are a finite number of potential investment banks, indexed by *i*. Consider an industry *n* with *N* firms, each firm choosing sequentially which investment bank *i* to use for an initial public offering. Each firm is small relative to a bank and cannot affect a bank's size. Denote by v_k the choice of a bank by firm *k*, and suppose profits to firm *k* from choosing bank *i* are

$$\log p_{kin} = \log \overline{p}_{in} + g_{in}(v_1, \cdots, v_{k-1}) + e_{kin},$$

where $\overline{p}_{in}$ are random variables measuring the impact on firm profits from bank *i*'s characteristics, (such as underwriter prestige,) g_{in} measures the impact on firm profits from bank *i*'s industry expertise (depending on choices of other firms),[9] and e_{kin} is a firm idiosyncratic shock.[10]

[9] Additional structure regarding the form of g_i is provided below.
[10] For reference, in EG, each of N firms in an industry choose sequentially a geographic area (state) *i* in which to locate. Firm profits from choosing area *i* depend on profitability from characteristics of area *i*, and industry spillovers in area *i*, depending on choices of other firms, as above.

As usual, for fixed *n*, when e_{kin} are independent Weibull, are independent of $\overline{p_{in}}$, and when firm profits do not depend on industry expertise, (that is, for each *i*, g_{in} is identically 0,) this model coincides with a standard logit model. In this case, firm *k*'s conditional probability of choosing bank *i* is $\text{prob}\{v_k = i | \overline{p_{1n}}, \cdots, \overline{p_{Mn}}\} = \frac{\overline{p_{in}}}{\sum_j \overline{p_{jn}}}$. It is assumed, as in EG, that

$$E_{\overline{p_{1n}}, \cdots \overline{p_{Mn}}} \frac{\overline{p_{in}}}{\sum_j \overline{p_{jn}}} = x_i,$$

where x_i is bank *i*'s share of all IPOs.[11] This serves two purposes.

First, notice that this model focuses on firm decision-making, and each firm is assumed to be small relative to a bank, and therefore, the modeling assumption is that a firm takes x_i as exogenously given. This model does not explain a bank's decision-making process, and of course, a bank's decision-making affects a bank's market share. The condition above can be viewed in terms of closing the model, because it implies (using EG's description; confer the next footnote) that on average, the model reproduces the overall distribution of IPO activity. Thus, although bank decision-making is not explained in the model, the above condition can be viewed as an expected market clearing condition; it requires that expected firm choices are consistent with realized bank shares (that may depend on bank decisions not modeled).[12]

[11] Notice that the left-hand side of the equality is specific to an industry, but the right-hand side is the share of all IPOs under consideration, not just for a particular industry.

[12] In EG, the variable x_i is state *i*'s share of all manufacturing employment, and it is assumed to be exogenous. Of course, in principle, a state can affect its share of manufacturing employment by providing incentives to attract certain industries; for example, attracting technology corridors in Virginia, or attracting car manufacturing in Alabama or Georgia. One may address this effect indirectly by postulating

Second, if variance of probability of firm's choice of bank is zero, then firms choose banks independently, with probability x_i, as if by throwing darts at a map of all banks with size of bank given by its market share. This formulates a benchmark.

For firms in this industry, the importance of underwriter prestige is incorporated in the model by assuming (as in EG) that there is a parameter $d_n^{pres} \in [0,1]$ specific to the industry such that the joint distribution of $\overline{p}_{in}$ satisfies $\text{var}\left(\frac{\overline{p}_{in}}{\sum_j \overline{p}_{jn}}\right) = d_n^{pres} x_i(1-x_i)$. This parameter is termed *underwriter prestige*,[13] and it is interpreted as a combined (and reduced form) measure of relevance to this industry of factors related to underwriter prestige.[14] When $d_n^{pres} = 0$, underwriter prestige has no impact on a firm's choice, (and choices are as in the standard logit model,) and underwriter prestige is relatively more important as d_n^{pres} increases.[15]

---

that although state decision-making is not explained in the model, the model is closed in the sense that *on average, the model reproduces the overall distribution of manufacturing activity* (words in italics from EG, page 893, explaining the above condition on expectation of relative profitability). However, it is a reasonable conjecture that a state can affect its own manufacturing activity less than a bank can affect its own market share, and in this sense, the exogeneity assumption is closer to reality in EG.

[13] In EG, the analogous parameter is termed *natural advantage*, and it indexes importance of state characteristics for firms in an industry.

[14] As mentioned above, firms in a particular industry might choose an investment bank partly because of its reputation, indicating the relevance of investment bank-specific factors, such as better bank placement of IPO shares depending on underwriter reputation, an overall reputation for better analysts or greater analyst coverage, a reputation for price stabilization activities or for liquidity, and so on.

[15] As shown in EG, an example of this specification is if the $\overline{p}_i$ are independent random variables scaled to have a chi-squared distribution with $x_i 2(1 - d_n^{pres})/d_n^{pres}$ degrees of freedom. Moreover, in this case, $\text{var}(\overline{p}_{in}) = x_i d_n^{pres}/(1-d_n^{pres})$, so that as d_n^{pres} approaches 1, underwriter prestige tends to dominate firm-specific idiosyncratic factors.

For firms in this industry, the importance of investment bank industry expertise (or industry experience, or industry knowledge) is captured by g_{in}, and it depends on choices of other firms. To make the model tractable, these benefits are assumed (as in EG) to be of the following form. For every pair of firms, either there is a benefit to these firms from choosing the same bank, or not. For tractability, it is assumed that these benefits are either extremely important or not important at all. That is, for every pair of firms, if there are benefits from same choice, then firms optimally choose the same bank, (otherwise they have negative infinite profits,) and if there are no benefits from same choice, then choice of either firm has no effect on choice of the other firm. The probability that a pair of firms has such extreme benefits from same choice is denoted $d_n^{expe} \in [0,1]$. This parameter is termed *industry expertise*,[16] and it is interpreted as a combined (and reduced form) measure of relevance to this industry of factors related to an underwriter's industry expertise.[17] More formally, it is assumed that

$$\log p_{kin} = \log \overline{p_{in}} + \sum_{l \neq k} e_{kln}(1-u_{li})(-\infty) + e_{kin} ,$$

where e_{kln} is an indicator for existence of benefits from same choice, with probability of existence of such benefits given by d_n^{expe}, u_{li} is an indicator for whether firm l chooses bank i, and the other variables are as before, with e_{kin} independent of e_{kln}. It is assumed further (as in EG) that among pairs of firms, the relationship of existence of benefits from

[16] In EG, the analogous parameter is termed *spillovers*, and it indexes benefits to firms from location choices of other firms. As they mention, such spillovers include technological spillovers, gains from labor markets, gains from interfirm trade, and so on.

[17] As mentioned above, some firms in an industry might choose an investment bank partly because this bank has successfully underwritten IPOs for other firms in the same industry, indicating the relevance of industry-specific information spillovers, such as better investment bank placements of IPO shares (whether through book-building, under-pricing, or share allocation) depending on number of industry deals done, more expert analyst coverage depending on number of industry deals done, economies of scope in information production costs (including lower marketing costs and better post-IPO stock liquidity) depending on number of industry deals done, and so on.

same choice is symmetric and transitive. (That is, for each n, $e_{kln} = 1$ implies $e_{lkn} = 1$, and $e_{kln} = 1$ and $e_{lmn} = 1$ implies $e_{kmn} = 1$.) This implies that the resulting distribution of firm choices is independent of the order in which firms make choices.[18]

This model specification implies a particular relationship between observed firm choices in an industry and the strength of a combination of d_n^{pres} and d_n^{expe} for this industry, as follows. As in EG, let z_{kn} be the relative size of firm k's IPO to industry IPOs,[19] and let u_{kin} indicate if firm k chooses bank i. Then bank i's share of this industry's IPOs is $s_{in} = \sum_k z_{kn} u_{kin}$. Therefore, a measure of the extent to which firms are more or less clustered with investment banks, relative to a bank's share of all IPOs, is $D_n = \sum_i (s_{in} - x_i)^2$. This can be viewed as a gross measure of relevance of bank-differentiating factors for firm choice. Suppressing the industry index in what follows, as shown in proposition 1 in EG,

$$E(D) = (1 - \sum_i x_i^2)[d + (1-d)H],$$

where $d = d^{pres} + d^{expe} - d^{pres} d^{expe}$, and $H = \sum_k z_k^2$ can be interpreted as an Herfindahl index of firm sizes. It is easy to see that $0 \le d \le 1$, that $d = 0 \Leftrightarrow d^{pres} = d^{expe} = 0$, that $d = 1 \Leftrightarrow d^{pres} = 1 \text{ or } d^{expe} = 1$, and that d is observationally equivalent to particular compositional changes in d^{pres} and d^{expe}.

[18] As noted in EG (page 895, footnote 4), for each n, the joint distribution of e_{kln} is not fully specified here. As EG note, the computation of $E(D_n)$ below is valid for all distributions satisfying the conditions here. As EG note, one such joint distribution is where the e_{knl} are perfectly correlated; that is, with some probability γ_0, all firms are completely interdependent, and with probability 1 - γ_0, all firm profits are independent.
[19] This calculation measures firm size.

Under the null hypothesis $d^{pres} = d^{expe} = 0$, $E(D) = (1 - \sum_i x_i^2)H$, and as shown in EG,

$$\text{var}(D) = 2\left\{H^2\left[\sum x_i^2 - 2\sum x_i^3 + (\sum x_i^2)^2\right] - \sum_j z_j^4\left[\sum x_i^2 - 4\sum x_i^3 + 3(\sum x_i^2)^2\right]\right\}.$$

Consequently, computing D and comparing it with $(1 - \sum_i x_i^2)H$ provides a test for existence of bank-differentiating factors.

Moreover, an index of the strength of bank-differentiating factors is

$$d = \frac{\sum_i (s_i - x_i)^2 - \left(1 - \sum_i x_i^2\right)H}{\left(1 - \sum_i x_i^2\right)(1 - H)}.$$

As shown in detail in EG, this index is an unbiased estimate of $d^{pres} + d^{expe} - d^{pres}d^{expe}$, it is comparable across industries in which firms float IPOs of different sizes, it is comparable across different segments of the IPO market, and it is comparable across time.

3. Data and Analysis

To keep this analysis consistent with Chen and Ritter (2000), the dataset used here is similar to the one they used, and is updated for more recent years.[20] The data consist of 4,181 firm commitment IPOs, each for $20 million or more,[21] in 544 four-digit SIC code industries from January 1985 through December 2003, derived from the New Issues

[20] There have been some updates to their data, since their paper was published. We are very grateful to Professor Ritter for providing us with an updated list of IPOs over $20 million for 1985-98. This list was used to refine SDC data. For reference, the number of above $20 million IPOs over 1985-98 in Chen and Ritter is 3,203, in the updated list, it is 3,229, and in our data, it is 3,196. Moreover, the number of moderate-sized IPOs over 1985-98 in Chen and Ritter is 2,488, and in our data, it is 2,506. Furthermore, for each of the different sub-periods considered here, sub-period results for frequency of 7 percent IPOs in Chen and Ritter are replicated here to within 0.3 percentage points.

[21] All dollars are in constant 1997 CPI dollars.

database of Securities Data Corporation (SDC). As in Chen and Ritter, ADRs, REITS, and unit offerings are excluded from the sample, as are 11 observations with unknown underwriters. Seven observations with SIC codes that cannot be matched to a master list of SIC codes are assigned codes based on observables such as industry type reported in the data. Industries are identified using four-digit SIC codes reported in the data.

The analysis here focuses on IPOs between $20 million and $80 million (moderate-sized IPOs). The dataset used for moderate-sized IPOs consists of 3,101 moderate-sized IPOs in 474 SIC4 industries from January 1985 through December 2003. Figure 1 extends Chen and Ritter's chart (Figure 1 in their paper) to include recent years, and it shows that spreads for moderate-sized IPOs have continued to converge to 7 percent. For the most recent period (1999-03), 96 percent of moderate-sized IPOs were priced at 7 percent. Additional data are provided in Table 1.

In the moderate-sized IPO market, the mean bank market share is small, at about 0.006 (6/10 of a percent), median is 0.001, and standard deviation is 0.013. However, consistent with existing information, the combined market share of the top 10 banks is about 50 percent, that of the top 25 banks is about 75 percent, and that of the top 50 banks is about 91 percent, and the remaining banks account for the remainder of the market share.[22] For moderate-sized IPOs, the correlation between bank market share and the average spread charged by the bank is low, at about -0.06.

[22] Additional information about different aspects of the structure of banks is provided in Hansen (2001).

As described above, to investigate the explanation that Chen and Ritter's results for moderate-sized IPOs are consistent with explanations based on investment bank-differentiating factors, the main hypothesis here is that for moderate-sized IPOs, bank-differentiating factors are relevant for firms choosing banks to underwrite IPOs. Additional analysis provides some information on industries for which differentiation exists. Results are as follows.

For moderate-sized IPOs, the evidence for existence of the hypothesized bank-provided industry-based differentiation is not widespread.

For moderate-sized IPOs, over the period 1985-2003, about 12 percent (30 of 360) of four-digit SIC industries with at least two observations[23] show evidence of relevance of bank-differentiating factors, as measured by a two-sided t-statistic of 2 or more. For the sub-periods 1985-87, 1988-94, 1995-98, and 1999-03, the comparable numbers are 12, 8, 10, and 4 percent, respectively. The numbers for these five experiments are shown Table 2, panel I, titled 'BASE CASE (SIC4)', row 6.

The distribution of SIC4 industries over IPO counts has a fat tail at the low end, and a long, narrow tail at the high end; that is, there are many industries with a relatively small number of IPOs, and there are a few industries with a relatively large number of IPOs. This can be seen in Figure 2, panel I. (For ease of reference, the x-axis in these panels is truncated at 50. Full data for panels I and II are given in Tables 2.1-2.5, (as discussed

[23] The differentiation index is not defined when the number of observations for an industry equals 1, because in this case, H = 1. The results here are presented for cases where there are at least 2 observations for an industry.

below as well,) and for panels III and IV in Table A.1 in the appendix.) The heavy line corresponds to the period 1985-03, and the different sub-periods show similar-shaped distributions. To understand the distributional effects on test results, four sets of robustness experiments are conducted – (1) averages of test results over various cutoffs of IPOs from a particular industry, (2) test results for a non-outlier sub-sample, (3) test results for SIC3 industries, and (4) test results for SIC2 industries.

The first robustness experiment considers SIC4 industries with at least i IPOs, and at most j IPOs, where i and j vary over the support of the distribution of IPO counts. For each such pair (i, j), the proportion of industries in which differentiation exists is computed. The mean and median of all such tests are shown in Table 2, panel I, lines 7.1 (titled 'Robust (Mean)') and 7.2 (titled 'Robust (Median)'). (Additional details are presented below.) Over 1985-03, at the mean (line 7.1), differentiating factors are relevant for about 26 percent of industries, and at the median (line 7.2), for about 24 percent of industries. For the sub-periods 1985-87, 1988-94, 1995-98, and 1999-03, the comparable numbers for the mean are 27, 15, 19, and 1 percent, respectively, and for the median are 25, 12, 15, and 0 percent, respectively. Thus, there do appear to be some distributional effects, but this experiment still yields absence of differentiation in a large proportion of industries.

Details for the numbers in lines 7.1 and 7.2 are presented in Tables 2.1-2.5. These tables can be read as follows. The first two columns of numbers present the distribution of industries (given in the first column) over IPO counts (given in the second column). For

example, in Table 2.1, (for the period 1985-03,) there are 174 industries with 1 IPO, 96 industries with 2 IPOs, 47 with 3 IPOs, 30 with 4 IPOs, and so on. For convenience, each fraction in each of these tables is referenced by a pair (i, j), where i and j vary over the support of the distribution of IPO counts, and over the words 'Mean' and 'Median'. The support of the distribution is shown in two places; in the second column, and in the first row of numbers. A fraction for pair (i, j) gives the proportion of industries in which differentiation exists, conditional on an industry having at least $i+1$ IPOs and at most j IPOs. For example, in Table 2.1, (for the period 1985-03,) entry (1, 353) is 0.12; that is, 12 percent of all industries with at least 2 IPOs and at most 353 IPOs (that is, the full sample for which the test can be computed) show existence of differentiation. Similarly, entry (2, 353) is 0.157; that is, about 16 percent of industries with at least 3 IPOs (that is, drop the 96 industries with 2 IPOs) and at most 353 IPOs show evidence of differentiation, and entry (1, 99) is 0.117; that is, about 12 percent of all industries with at least 2 IPOs and at most 99 IPOs (that is, drop the one largest industry) show evidence of differentiation. Similarly, entries on the cross-diagonal show the proportion of industries in which differentiation exists, conditional on an industry having exactly the number of column IPOs. For example, entry (27, 30) is 0.5; that is, one-half of industries with exactly 30 IPOs show existence of differentiation; and from the column for distribution of industries, it can be seen that there are exactly two such industries. Thus, one out of the two industries with 30 IPOs shows existence of differentiation. Similarly, entry (26, 27) shows that the one industry with 27 IPOs does not show evidence of differentiation, whereas entry (25, 26) shows that the one industry with 26 IPOs does show evidence of differentiation. These test results show, broadly, that the largest industries are potentially

tending to move the results toward higher proportions of existence, and the smallest industries are potentially tending to move the result toward lower proportions. Consequently, outlier industries can potentially affect the test results.

To see the potential distributional impact, averages of these test results are presented in the rows and columns indexed 'Mean' and 'Median'. For example, in Table 2.1, (for the period 1985-03,) toward the end of the column indexed 353, the entry (Mean, 353) is 0.392; that is, if we keep dropping the smallest industries, and go all the way up to the largest industry (353 IPOs), at the mean, 39 percent of industries show evidence of differentiation, and at the median, entry (Median, 353), 33 percent of the industries show evidence of differentiation. Similarly, entry (Mean, 99) is 0.344; that is, if we consider industries with at most 99 IPOs (that is, drop the largest industry), and look at the impact on the test for existence by dropping smaller industries successively, then at the mean, 34 percent of the industries show evidence of differentiation, and at the median, entry (Median, 99), 31 percent of the industries show evidence of differentiation. In other words, the rows indexed 'Mean' and 'Median' present the "average" comparative statics of test results if we drop the "largest" industries. Looking across these rows shows that as we drop large industries, the test results decline a little initially, then increase till about the mid-size industries, and then decline as we keep dropping all but the smallest industries. Similarly, the columns indexed 'Mean' and 'Median' present the "average" comparative statics of test results if we drop the "smallest" industries. Looking down these columns shows that as we drop the smallest industries, the test results increase till about the mid-size industries, then decline a little for the larger industries, and they

finally increase as we drop all but the 5 or 6 largest industries (consider entries in rows indexed 58-99, and columns indexed 'Mean' and 'Median'). Moreover, entries (Mean, 1) and (Median, 1) are the mean and median, respectively, of entries in the rows indexed 'Mean' and 'Median,' respectively. Similarly, entries (353, Mean) and (353, Median) are the mean and median, respectively, of entries in the columns indexed 'Mean' and 'Median,' respectively. Finally, entry (Mean, Mean) is 0.26, and it is the average of entries (Mean, 1) and (353, Mean), and entry (Median, Median) is 0.239, and it is the average of entries (Median, 1) and (353, Median), and these two numbers are presented in lines 7.1 and 7.2, respectively. Similar trends are present in the four sub-periods. (Confer Tables 2.2-2.5.) Thus, as mentioned above, this experiment shows a greater chance of differentiation existing in a handful of the largest industries, but this experiment confirms absence of differentiation in a large proportion of industries.

The second robustness experiment drops outlier industries at both ends of the distribution, and computes test results for a non-outlier sub-sample. The industries dropped are as follows. For the period 1985-03, industries with 4 or less IPOs are dropped, as are 6 of the 8 largest industries – five of these 6 industries are closely related by SIC code (737x and 738x, broadly, for computers and software), and the sixth is for semiconductors, and therefore, related to the other five. (Characteristics of industries with differentiation are discussed below.) More precisely, the six industries dropped are Prepackaged Software (SIC4 code 7372, with 353 IPOs), Semiconductors and Related Devices (3674, 99 IPOs), Computer Integrated Systems Design (7373, 91 IPOs), Information Retrieval Services (7375, 84 IPOs), Business Services, NEC (7389, 67

IPOs), and Computer Programming Services (7371, 58 IPOs). (As mentioned above, if desired, distributions of industries by IPO counts can be viewed in Tables 2.1-2.5.) For the period 1985-87, industries with 2 or less IPOs are dropped, as are the two largest industries; Savings Institutions, Federally Chartered (6035, 23 IPOs), and Savings Institutions, Not Federally Chartered (6036, 18 IPOs). For the period 1988-94, industries with 3 or less IPOs are dropped, as are the four largest industries; Prepackaged Software (7372, 65 IPOs), Pharmaceutical Preparations (2834, 35 IPOs), Eating and Driking Places (5812, 28 IPOs), and Semiconductors and Related Devices (3674, 28 IPOs). For the period 1995-98, industries with 3 or less IPOs are dropped, as are the five largest industries; Prepackaged Software (7372, 143 IPOs), Computer Integrated Systems Design (7373, 43 IPOs), Computer Programming Services (7371, 42 IPOs), Semiconductors and Related Devices (3674, 36 IPOs), and Business Services, NEC (7389, 31 IPOs). For the period 1999-03, industries with 3 or less IPOs are dropped, as are the four largest industries; Prepackaged Software (7372, 132 IPOs), Information Retrieval Services (7375, 55 IPOs), Business Services, NEC (7389, 32 IPOs), and Semiconductors and Related Devices (3674, 31 IPOs). For this non-outlier sub-sample, the distribution of industries over IPO counts is shown in Figure 2, panel II. The heavy line corresponds to the period 1985-03. The other sub-periods show broadly similar distributions.[24] The test results for this sub-sample are reported in Table 2, panel II, titled 'Non-Outlier Sub-Sample.' As shown in line 6, for 1985-2003, about 16 percent (19 of 121) of industries show evidence of relevance of bank-differentiating factors. For the sub-periods 1985-87, 1988-94, 1995-98, and 1999-03, the comparable numbers are 19, 7,

[24] The 1985-87 distribution is higher at 3, because industries with 3 IPOs are kept in this sub-period. This helps prevent the sub-sample from dropping a large proportion of the original sample. Confer the next footnote as well.

12, and 0 percent, respectively.[25] Therefore, this robustness experiment confirms absence of differentiation in a large proportion of industries.

The third robustness experiment looks at coarser industry classifications, by considering industries at the SIC3 level. Intuitively, it can be conjectured that SIC4 classifications may be too narrow for banks to specialize; for example, banks might not focus on Natural Gas Transmission (SIC4 4922) separately from Natural Gas Transmission and Distribution (SIC4 4923), or on Printed Circuit Boards (SIC4 3672) separately from Semiconductors and Related Devices (SIC 3674). For SIC3 classification, the distribution of industries over IPO counts is shown in Figure 2, panel III. The heavy line corresponds to the period 1985-03. As compared to the SIC4 classification, the SIC3 distribution for 1985-03 is noticeably lower at the smaller industry end, but for the sub-periods, the SIC3 distributions still show relatively elevated densities for the smaller industries. (Data are presented in Table A.1 in the appendix.) Test results for this experiment are reported in Table 2, panel III, titled 'SIC3.' As shown in line 6, for 1985-2003, about 13 percent (28 of 209) of industries show evidence of relevance of bank-differentiating factors. For the sub-periods 1985-87, 1988-94, 1995-98, and 1999-03, the comparable numbers are 6, 13, 11, and 14 percent, respectively. Once again, this robustness experiment confirms absence of differentiation in a large proportion of industries.

The fourth robustness experiment looks at still coarser industry classifications, by considering industries at the SIC2 level. This classification allows for broad industry

[25] For reference, another experiment was conducted with a sub-sample that deleted only the observations listed above for the period 1985-03. For that experiment, test results for 1985-03 are unchanged, of course. Moreover, test results for the sub-periods remained low; 12, 9, 10, and 4 percent, respectively.

categories; for example, Electric Housewares and Fans (SIC4 3634) is in the same SIC2 class as Semiconductors and Related Devices (SIC4 3672). Similarly, Automobiles and Other Motor Vehicles (SIC4 5012), Furniture (SIC4 5021), Electrical Apparatus and Equipment Wiring (SIC4 5063), and Toys and Hobby Goods and Supplies (SIC4 5092) are all in the same SIC2 class. For SIC2 classification, the distribution of industries over IPO counts is shown in panel IV of Figure 2. The heavy line corresponds to the period 1985-03, and it looks considerably more uniform than the other cases. The sub-periods still show relatively elevated densities for the smaller industries, but these are noticeably lower as compared to SIC4 and SIC3. (Data for SIC2 are presented in Table A.1 in the appendix.) Test results for this experiment are reported in Table 2, panel IV, titled 'SIC2.' As shown in line 6, for 1985-2003, about 24 percent (15 of 63) of industries show evidence of relevance of bank-differentiating factors. For the sub-periods 1985-87, 1988-94, 1995-98, and 1999-03, the comparable numbers are 7, 20, 18, and 17 percent, respectively. Once again, this robustness experiment confirms absence of differentiation in a large proportion of industries.

Finally, to see the effect on test results of the high frequency of technology IPOs in the period 1998-2000, another three experiments (splitting the last two sub-periods into three sub-periods) were conducted. The results of these are in Table 2, panel V, titled 'ADJUSTED TIME PERIODS'. The percentages (row 6) for the three new sub-periods are a little lower than in the comparable two sub-periods in the base case, and overall, the results are similar to the base case.

Additional details about test results for all SIC4 industries in the sample, and by frequency of IPOs are provided in Table A.2 in the appendix. As can be inferred from this table, there is no clear pattern that if differentiation exists for an industry then it necessarily exists for industries with similar SIC4 codes, or if differentiation exists for an industry in one period then it necessarily exists in other periods as well.

Taken together, these experiments show that other than in a handful of the very largest industries, there does not appear to be widespread existence of differentiation, contrary to hypothesis.

To explore characteristics of industries in which differentiation exists, and the extent to which differentiation exists, three of the above sets of experiments are considered in more detail; these are the ones based on SIC4, SIC3, and SIC2 classifications. In each case, the focus is on the period 1985-03.

For each of these cases, Figure 3 presents the differentiation index (d) by industry code, conditional on existence of differentiation, and a corresponding histogram for the differentiation indices. In each case, industries in which differentiation exists are fairly diffused across the space of industries, showing no obvious pattern of existence, and for the bulk of industries, the differentiation index is less than 0.2, as shown in the corresponding histogram.[26] As shown in the bottom right panel, moving to broader

[26] For the SIC4 histogram, the bar for 0 includes 2 outliers with negative differentiation index (SIC4 2325 'Men's and Boys' Trousers and Slacks', Number of IPOs 2, Differentiation Index -0.59) and (SIC4 4822 'Telegraph and Other Message Communications', Number of IPOs 2, Differentiation Index -0.42), and the bar for 1 includes 1 outlier with differentiation index greater than 1 (SIC4 2331 'Women's, Misses', and

industry classifications concentrates the distribution of differentiation indices toward the range 0-0.1. Some additional details for industries with differentiation are presented in Tables A.3 and A.4 in the appendix.

At the SIC2 level, (details are in Table A.4 in the appendix,) industries exhibiting differentiation appear to straddle relatively well-established industry segments (SIC2 13 'Oil and Gas Exploration'; SIC2 20 'Food and Kindred Products'; SIC2 42 'Motor Freight Transportation and Warehousing'; SIC2 58 'Eating and Drinking Places'; SIC2 59 'Miscellaneous Retail', SIC2 70 'Hotel, Rooming Houses, Camps, and Other Lodging Places'), relatively newer industry segments (SIC2 28 'Chemicals and Allied Products', which includes pharmaceutical preparations, and biological products; SIC2 48 'Communications'; SIC2 80 'Health Services'), and mixtures of established and newer industry segments (SIC36 'Electrical and Electronic Equipment', which includes household audio and video equipment, phonograph and prerecorded audio tapes, telephone and telegraph apparatus, printed circuit boards, and semiconductors; SIC2 73 'Business Services', which includes categories of computer and software, and also medical equipment rental and leasing, equipment rental and leasing, help supply services).

To provide a sense of the "average level" of differentiation that exists in a given time period, the weighted (by number of IPOs) average of differentiation indices is computed,

---

Juniors' Blouses', Number of IPOs 2, Differentiation Index 1.113). For the SIC3 histogram, the bar for 0 includes 1 outlier with negative differentiation index (SIC3 482, Number of IPOs 2, Differentiation Index -0.42). For clarity of comparison, these industries are not shown in the corresponding graph by SIC code. Full data are presented in Tables A.3 and A.4 in the appendix.

for industries in which differentiation exists.[27] This can be viewed as an aggregate measure of the level of differentiation that exists in a given time period. This measure is shown in Table 3. Notably, for each of the three SIC classifications considered here, this measure is small and is decreasing over time.[28] Therefore, aggregate levels of differentiation do not appear to be increasing over time. This can be viewed as a slight extension of Chen and Ritter's puzzle; not only is price stability increasing over time, at least one measure of aggregate differentiation appears to be decreasing over time. Intuitively, it can be conjectured that the moderate-sized IPO industry, as a whole, appears to be moving toward lower levels of differentiation.

4. Conclusion

This paper presents some results on the relevance of investment bank-differentiating factors in firm choices of investment banks to underwrite IPOs. These results show that for moderate-sized IPOs, there is a greater chance that differentiation exists in a few of the very largest industries, but bank-differentiating factors over and above bank size are not significantly relevant for firms in a large proportion of industries. Moreover, at least one aggregate measure of differentiation is declining over time.

Notably, the analysis here does not investigate implicit collusion as a possible explanation. Chen and Ritter's puzzle is consistent with that explanation as well, and there is a growing literature that addresses that question.

[27] A similar measure cannot be constructed with great confidence at the industry level, because very few industries show existence of differentiation in all time periods.

[28] Not much confidence can be placed in one of these numbers; the number for SIC4 in the period 1999-03 is based on two small industries, one of which has a negative index. Details are in Tables A.3 and A.4 in the appendix.

As mentioned above, this analysis can inquire if combinations of investment bank-differentiating factors are important to firm choices, but it cannot investigate the importance of each such component. Consequently, a limitation of this analysis is that it does not shed light on the relevance of particular factors (such as underwriter reputation, quality of book-building, under-pricing, analyst coverage, over-allotment options, liquidity, and so on) on a firm's choice of underwriter. On the other hand, this analysis bypasses potential difficulties in measuring some of these factors. Additional work trying to understand the role of specific bank-differentiating factors would be very useful, both in trying to understand their direct effect on firm choices, and in trying to understand underwriter incentives regarding the provision of such differentiating factors. Such additional work could further shed light on the determination of IPO pricing in a broad sense that includes a joint determination of spreads, under-pricing, share allocation, after-market price stabilization, and other bank-differentiating factors. This can help explain more completely Chen and Ritter's seven percent puzzle.

References

Anand, B. N. and A. Galetovic, 2002, Investment Banking and Security Market Development: Why is Chile different from the United States? Working paper, Harvard University

Anand, B.N. and A. Galetovic, 2000, Relationships, Competition, and the Structure of Investment Banking Markets, Working paper, Harvard University

Beatty, R. and Jay Ritter, 1986, Investment banking, reputation, and the underpricing of initial public offerings, *Journal of Financial Economics*, 15, 213-232

Benveniste, L. and P. A. Spindt, 1989, How Investment Bankers Determine the Offer Price and Allocation of New Issues, *Journal of Financial Economics*, 24, 343-361

Benveniste, L. M., A. Ljungqvist, W. J. Wilhelm Jr., and X. Yu, 2003, Information externalities and the role of underwriters in primary equity markets, *Journal of Finance*, 58(2), 577-608

Benveniste, L. M., W. Busaba, and W. J. Wilhelm, 2002, Information externalities and the role of underwriters in primary equity markets, *Journal of Financial Intermediation*, 11, 61-86

Booth, J., and R. Smith, 1986, Capital raising, underwriting, and the certification hypothesis, *Journal of Financial Economics* 15, 261-281

Carter, R., F. Dark, and A. Singh, 1998, Underwriter reputation, initial returns, and the long-run performance of IPO stocks, *Journal of Finance*, 53(February), 285-311

Carter, R., and S. Manaster, 1990, Initial public offerings and underwriter reputation, *Journal of Finance* 45 (September), 1045-1067

Chemmanur, T., and P. Fulghieri, 1994, Investment bank reputation, information production, and financial intermediation, *Journal of Finance* 49, 59-79

Chen, H-C, 1998, Competition and Collusion in the IPO Market, Working Paper, University of Florida

Chen, H-C, and J.R. Ritter, 2000, The seven percent solution, *Journal of Finance* 55, 1105-1131

Christie, W., and P. Schultz, 1994, Why do Nasdaq market makers avoid odd-eighth quotes? *Journal of Finance* 49, 1813-1840

Christie, W., J. Harris, and P. Schultz, 1994, Why did Nasdaq market makers stop avoiding odd-eighth quotes? *Journal of Finance* 49, 1841-1860

Dunbar, C.G., 2000, Factors affecting investment bank initial public offering market share, *Journal of Financial Economics* 55, 3-41

Dutta, P., and A. Madhavan, 1997, Competition and collusion in dealer markets, *Journal of Finance* 52, 245-276

Eccles, R.G., and D.B. Crane, 1988, *Doing Deals*, Harvard Business School, Cambridge

Ellison, G., and E. Glaeser, 1997, Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach, *Journal of Political Economy* 105, 889-927

Gande, A., M. Puri, and A. Saunders, 1999, Bank entry, competition, and the market for corporate securities underwriting, *Journal of Financial Economics* 54, 165-195

Gordon, B. R., 2003, The Seven Percent Illusion? Working Paper, Carnegie Mellon University

Hansen, R.S., 2001, Do investment banks compete in IPOs? The advent of the "7% plus contract, *Journal of Financial Economics*, 59, 313-346

James C., 1992, Relationship-specific assets and the pricing of underwriting services, *Journal of Finance* 47, 1865-1885

Krigman, L., W. H. Shaw, and K. L. Womack, 2001, Why do firms switch underwriters? *Journal of Financial Economics* 60, 245-284

Logue, D. E., R. J. Rogalski, J. K. Seward, and L. Foster-Johnson, 2002, What is special about the roles of underwriter reputation and market activities in initial public offerings?, *Journal of Business*, 75 (2), 213-243

Lowenstein, Roger, 1997, Street's incredible unshrinking spread, The Wall Street Journal, April 10, C1

Lowry, Michelle and G. William Schwert, 2002, IPO market cycles: Bubbles or sequential learning? *Journal of Finance* 57, 1171-1200

Ljungqvist, A., and W. J. Wilhelm, Jr., 1999, The seven percent solution? An international perspective on underwriting spreads, Working paper, Said Business School

Ritter, Jay, and Ivo Welch, 2002, A Review of IPO Activity, Pricing, and Allocations, *Journal of Finance*, 57 (4), 1795-1828

Rotemberg, J., and G. Saloner, 1986, A super-game theoretical model of price wars during booms, *American Economic Review* 76, 390-407

Figure 1. Gross Spreads: Moderate-Sized IPOs
(Extension of Chen and Ritter, Figure 1.)

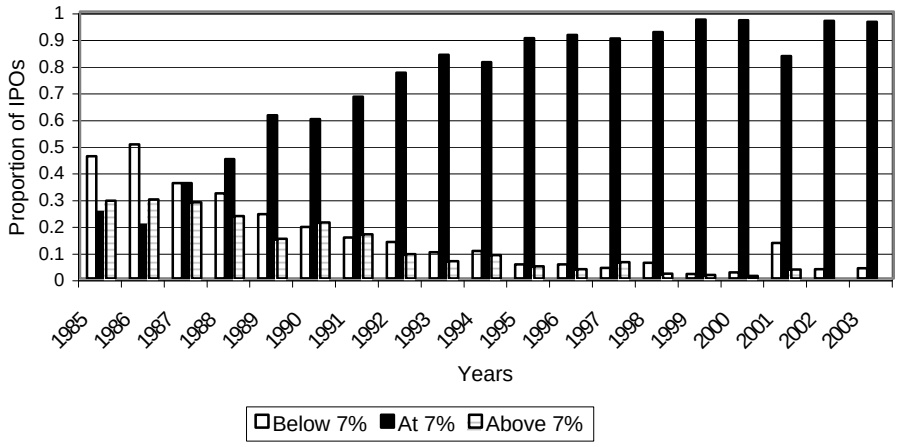


Table 1: Moderate-Sized IPOs ($20-$80 million, 1997 CPI dollars)

	Number					Proportion		
Period	Below 7%	At 7%	Above 7%	Total		Below 7%	At 7%	Above 7%
1985-87	173	104	114	391		0.442	0.266	0.292
1988-94	138	734	111	983		0.140	0.747	0.113
1995-98	57	1028	47	1132		0.050	0.908	0.042
1999-03	16	583	7	606		0.026	0.962	0.012
Total	384	2449	279	3112		0.123	0.787	0.090

"Kulkarni, Kedar and Tarun Sabarwal (2007): "To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?"
Annals of Finance, 3(3), July, 297-327. Publisher's official version: http://dx.doi.org/10.1007/s10436-006-0054-y.Open Access version: http://kuscholarworks.ku.edu/dspace/.

Table 2. Existence of Differentiation

		1985-03	1985-87	1988-94	1995-98	1999-03
	I. BASE CASE (SIC4)					
1	Number of IPOs	3101	384	982	1129	606
2	Number of Banks	197	54	91	108	83
3	Number of Industries	474	185	304	276	118
4	Industries with >1 obs	300	68	167	146	54
5	Differentiation Exists (N)	36	8	14	14	2
6	Differentiation Exists (Prop.)	0.120	0.118	0.084	0.096	0.037
7	Differentiation Exists (Robust)					
	7.1 Robust (Mean)	0.260	0.271	0.153	0.186	0.011
	7.2 Robust (Median)	0.239	0.247	0.118	0.153	0.000
	II. NON-OUTLIER SUB-SAMPLE					
1	Number of IPOs	1722	168	439	521	228
2	Number of Banks	164	33	69	81	48
3	Number of Industries	121	37	57	61	24
4	Industries with >1 obs	121	37	57	61	24
5	Differentiation Exists (N)	19	7	4	7	0
6	Differentiation Exists (Prop.)	0.157	0.189	0.070	0.115	0.000
	III. SIC3					
3	Number of Industries	262	137	193	174	85
4	Industries with >1 obs	209	68	126	115	36
5	Differentiation Exists (N)	28	4	16	13	5
6	Differentiation Exists (Prop.)	0.134	0.059	0.127	0.113	0.139
	IV. SIC2					
3	Number of Industries	67	57	64	59	38
4	Industries with >1 obs	63	43	55	56	24
5	Differentiation Exists (N)	15	3	11	10	4
6	Differentiation Exists (Prop.)	0.238	0.070	0.200	0.179	0.167

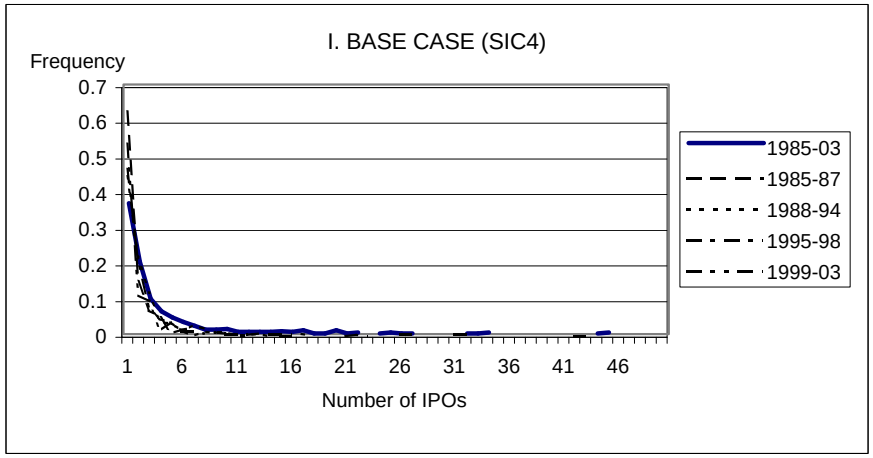
	V. ADJUSTED TIME PERIODS	1985-03	1985-87	1988-94	1995-97	1998-00	2001-03
1	Number of IPOs	3101	384	982	960	690	85
2	Number of Banks	197	54	91	100	90	38
3	Number of Industries	474	185	304	253	148	47
4	Industries with >1 obs	300	68	167	127	67	12
5	Differentiation Exists (N)	36	8	14	10	4	0
6	Differentiation Exists (Prop.)	0.120	0.118	0.084	0.079	0.060	0.000

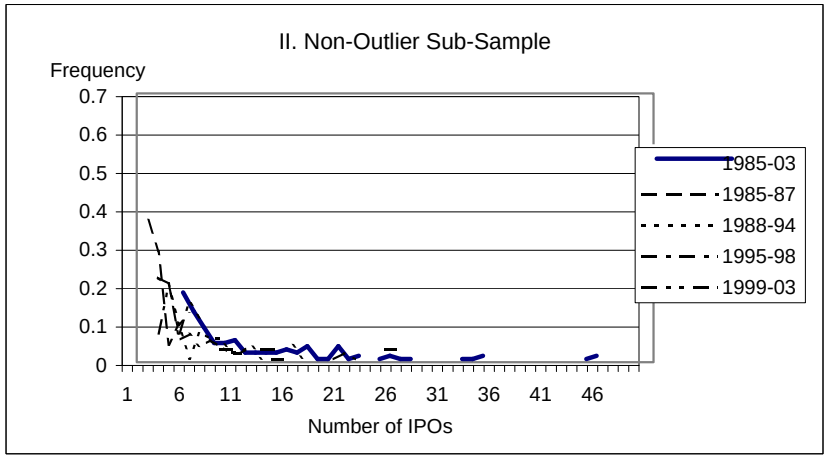
Note.

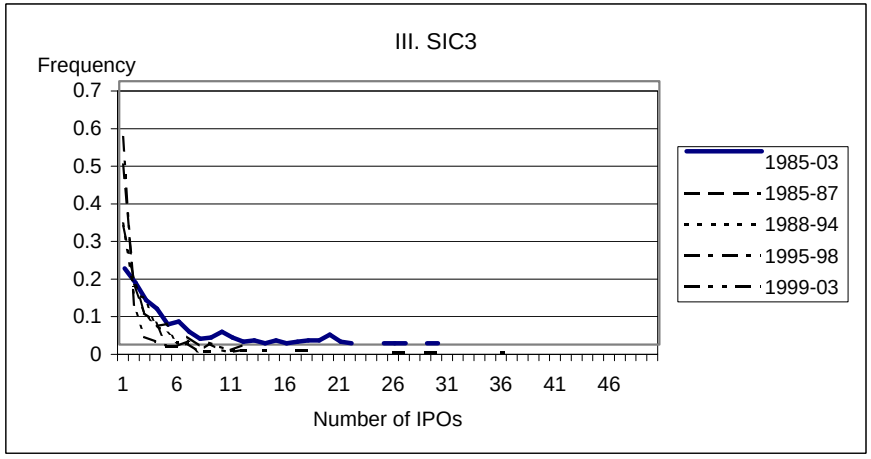
Rows 1 and 2 of panels III and IV are the same as in panel I.

"Kulkarni, Kedar and Tarun Sabarwal (2007): "To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?"
Annals of Finance, 3(3), July, 297-327. Publisher's official version: http://dx.doi.org/10.1007/s10436-006-0054-y.Open Access version: http://kuscholarworks.ku.edu/dspace/.

Figure 2. Distribution of Industries by IPO Counts







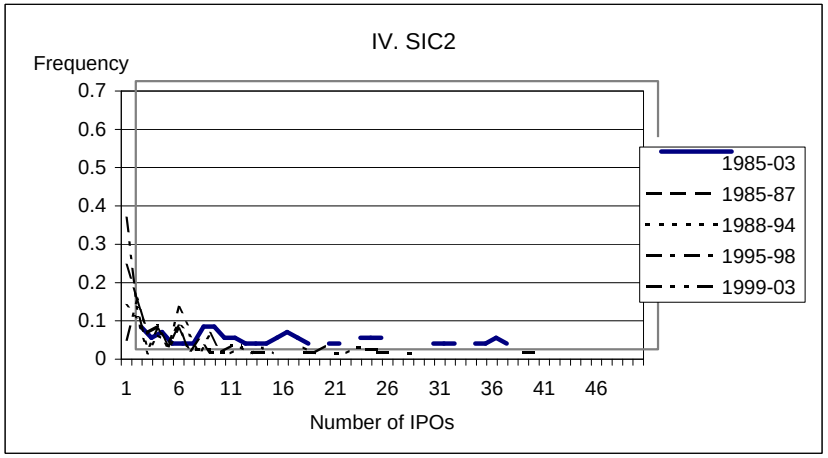


Table 2.1. Test Results by Various Cutoffs of IPO Counts (1985-03)

No. of Ind.	Drop ind. w/ freq <=n Freq.	Drop industries with frequency > n Freq. 353	99	91	88	84	67	58	56	47	45	44	41	36	34	33	32	30	27	26	25	24	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Mean	Median
174	1	0.12	0.117	0.114	0.114	0.111	0.108	0.109	0.109	0.11	0.11	0.107	0.108	0.108	0.108	0.109	0.11	0.11	0.107	0.108	0.104	0.101	0.098	0.095	0.092	0.086	0.086	0.087	0.085	0.086	0.083	0.08	0.077	0.078	0.079	0.081	0.075	0.077	0.076	0.077	0.075	0.063	0.042	0.095	0.1
96	2	0.157	0.153	0.149	0.149	0.145	0.141	0.141	0.142	0.143	0.144	0.14	0.141	0.141	0.142	0.144	0.144	0.145	0.141	0.142	0.137	0.133	0.128	0.124	0.119	0.111	0.112	0.112	0.11	0.112	0.108	0.104	0.099	0.101	0.103	0.109	0.098	0.103	0.104	0.111	0.117	0.106		0.127	0.133
47	3	0.172	0.167	0.161	0.162	0.157	0.151	0.152	0.153	0.154	0.155	0.151	0.152	0.153	0.154	0.156	0.157	0.158	0.153	0.154	0.148	0.143	0.136	0.131	0.124	0.113	0.114	0.115	0.111	0.114	0.109	0.103	0.096	0.099	0.102	0.11	0.094	0.101	0.103	0.115	0.133			0.135	0.146
30	4	0.181	0.175	0.168	0.169	0.163	0.156	0.157	0.158	0.16	0.161	0.155	0.157	0.158	0.159	0.162	0.164	0.165	0.159	0.16	0.152	0.146	0.137	0.13	0.121	0.106	0.108	0.109	0.103	0.107	0.1	0.091	0.081	0.085	0.088	0.098	0.073	0.082	0.079	0.091				0.133	0.152
22	5	0.2	0.192	0.184	0.186	0.178	0.17	0.172	0.173	0.175	0.177	0.17	0.172	0.174	0.176	0.18	0.182	0.184	0.176	0.179	0.169	0.16	0.15	0.141	0.13	0.111	0.113	0.114	0.108	0.113	0.103	0.091	0.077	0.082	0.087	0.103	0.061	0.074	0.063					0.143	0.169
16	6	0.225	0.216	0.207	0.209	0.2	0.19	0.193	0.195	0.198	0.2	0.192	0.195	0.197	0.2	0.205	0.208	0.211	0.203	0.206	0.194	0.185	0.172	0.161	0.148	0.125	0.127	0.13	0.122	0.13	0.119	0.103	0.083	0.091	0.1	0.13	0.059	0.091						0.165	0.192
11	7	0.244	0.234	0.224	0.227	0.216	0.205	0.208	0.211	0.214	0.217	0.209	0.212	0.215	0.219	0.226	0.23	0.233	0.224	0.228	0.214	0.204	0.189	0.176	0.16	0.133	0.136	0.14	0.132	0.143	0.129	0.107	0.08	0.091	0.105	0.167	0							0.181	0.209
6	8	0.264	0.254	0.243	0.246	0.235	0.224	0.227	0.231	0.234	0.238	0.23	0.233	0.237	0.241	0.25	0.255	0.259	0.25	0.255	0.24	0.229	0.213	0.2	0.182	0.154	0.158	0.162	0.156	0.172	0.16	0.136	0.105	0.125	0.154	0.333								0.214	0.231
6	9	0.258	0.246	0.234	0.238	0.226	0.213	0.217	0.22	0.224	0.228	0.218	0.222	0.226	0.231	0.24	0.245	0.25	0.239	0.244	0.227	0.214	0.195	0.179	0.158	0.121	0.125	0.129	0.115	0.13	0.105	0.063	0	0	0									0.182	0.219
7	10	0.288	0.276	0.263	0.268	0.255	0.241	0.245	0.25	0.255	0.26	0.25	0.255	0.261	0.267	0.279	0.286	0.293	0.282	0.289	0.27	0.257	0.235	0.219	0.194	0.154	0.16	0.167	0.158	0.188	0.167	0.111	0	0										0.222	0.255
3	11	0.304	0.291	0.278	0.283	0.269	0.255	0.26	0.265	0.271	0.277	0.267	0.273	0.279	0.286	0.3	0.308	0.316	0.306	0.314	0.294	0.281	0.258	0.241	0.214	0.174	0.182	0.19	0.188	0.231	0.222	0.167	0											0.251	0.27
3	12	0.321	0.308	0.294	0.3	0.286	0.271	0.277	0.283	0.289	0.295	0.286	0.293	0.3	0.308	0.324	0.333	0.343	0.333	0.344	0.323	0.31	0.286	0.269	0.24	0.2	0.211	0.222	0.231	0.3	0.333	0.333												0.292	0.295
3	13	0.32	0.306	0.292	0.298	0.283	0.267	0.273	0.279	0.286	0.293	0.282	0.289	0.297	0.306	0.324	0.333	0.344	0.333	0.345	0.321	0.308	0.28	0.261	0.227	0.176	0.188	0.2	0.2	0.286	0.333													0.284	0.291
3	14	0.319	0.304	0.289	0.295	0.279	0.262	0.268	0.275	0.282	0.289	0.278	0.286	0.294	0.303	0.323	0.333	0.345	0.333	0.346	0.32	0.304	0.273	0.25	0.211	0.143	0.154	0.167	0.143	0.25														0.273	0.286
4	15	0.326	0.31	0.293	0.3	0.282	0.263	0.27	0.278	0.286	0.294	0.281	0.29	0.3	0.31	0.333	0.346	0.36	0.348	0.364	0.333	0.316	0.278	0.25	0.2	0.1	0.111	0.125	0															0.27	0.292
3	16	0.35	0.333	0.316	0.324	0.306	0.286	0.294	0.303	0.313	0.323	0.31	0.321	0.333	0.346	0.375	0.391	0.409	0.4	0.421	0.389	0.375	0.333	0.308	0.25	0.143	0.167	0.2																0.319	0.323
5	17	0.371	0.353	0.333	0.344	0.323	0.3	0.31	0.321	0.333	0.346	0.333	0.348	0.364	0.381	0.421	0.444	0.471	0.467	0.5	0.462	0.455	0.4	0.375	0.286	0	0																	0.348	0.35
1	18	0.382	0.364	0.344	0.355	0.333	0.31	0.321	0.333	0.346	0.36	0.348	0.364	0.381	0.4	0.444	0.471	0.5	0.5	0.538	0.5	0.5	0.444	0.429	0.333	0																		0.384	0.364
1	19	0.394	0.375	0.355	0.367	0.345	0.321	0.333	0.346	0.36	0.375	0.364	0.381	0.4	0.421	0.471	0.5	0.533	0.538	0.583	0.545	0.556	0.5	0.5	0.4																			0.428	0.397
5	20	0.393	0.37	0.346	0.36	0.333	0.304	0.318	0.333	0.35	0.368	0.353	0.375	0.4	0.429	0.5	0.545	0.6	0.625	0.714	0.667	0.75	0.667	1																				0.483	0.393
1	21	0.37	0.346	0.32	0.333	0.304	0.273	0.286	0.3	0.316	0.333	0.313	0.333	0.357	0.385	0.455	0.5	0.556	0.571	0.667	0.6	0.667	0.5																					0.413	0.352
2	22	0.36	0.333	0.304	0.318	0.286	0.25	0.263	0.278	0.294	0.313	0.286	0.308	0.333	0.364	0.444	0.5	0.571	0.6	0.75	0.667	1																						0.42	0.333
1	24	0.333	0.304	0.273	0.286	0.25	0.211	0.222	0.235	0.25	0.267	0.231	0.25	0.273	0.3	0.375	0.429	0.5	0.5	0.667	0.5																							0.333	0.279
2	25	0.318	0.286	0.25	0.263	0.222	0.176	0.188	0.2	0.214	0.231	0.182	0.2	0.222	0.25	0.333	0.4	0.5	0.5	1																								0.312	0.25
1	26	0.286	0.25	0.211	0.222	0.176	0.125	0.133	0.143	0.154	0.167	0.1	0.111	0.125	0.143	0.2	0.25	0.333	0																									0.174	0.16
1	27	0.3	0.263	0.222	0.235	0.188	0.133	0.143	0.154	0.167	0.182	0.111	0.125	0.143	0.167	0.25	0.333	0.5																										0.213	0.182
2	30	0.278	0.235	0.188	0.2	0.143	0.077	0.083	0.091	0.1	0.111	0	0	0	0	0	0																											0.094	0.087
1	32	0.294	0.25	0.2	0.214	0.154	0.083	0.091	0.1	0.111	0.125	0	0	0	0	0																												0.108	0.1
1	33	0.313	0.267	0.214	0.231	0.167	0.091	0.1	0.111	0.125	0.143	0	0	0	0																													0.126	0.118
2	34	0.357	0.308	0.25	0.273	0.2	0.111	0.125	0.143	0.167	0.2	0	0	0																														0.164	0.167
1	36	0.385	0.333	0.273	0.3	0.222	0.125	0.143	0.167	0.2	0.25	0	0																															0.2	0.211
1	41	0.417	0.364	0.3	0.333	0.25	0.143	0.167	0.2	0.25	0.333	0																																0.251	0.25
1	44	0.455	0.4	0.333	0.375	0.286	0.167	0.2	0.25	0.333	0.5																																	0.33	0.333
2	45	0.444	0.375	0.286	0.333	0.2	0	0	0	0																																		0.182	0.2
1	47	0.5	0.429	0.333	0.4	0.25	0	0	0																																			0.239	0.292
1	56	0.571	0.5	0.4	0.5	0.333	0	0																																				0.329	0.4
1	58	0.667	0.6	0.5	0.667	0.5	0																																					0.489	0.55
1	67	0.8	0.75	0.667	1	1																																						0.843	0.8
1	84	0.75	0.667	0.5	1																																							0.729	0.708
1	88	0.667	0.5	0																																								0.389	0.5
1	91	1	1																																									1	1
1	99	1																																										1	1
1	353																																											0.316	0.275
	Mean	0.392	0.344	0.278	0.325	0.265	0.178	0.191	0.207	0.225	0.25	0.192	0.206	0.222	0.241	0.279	0.311	0.353	0.332	0.397	0.338	0.345	0.28	0.272	0.199	0.119	0.132	0.148	0.131	0.169	0.159	0.124	0.064	0.075	0.091	0.141	0.066	0.088	0.085	0.099	0.108	0.085	0.042	0.204	0.26
	Median	0.329	0.308	0.275	0.295	0.25	0.176	0.196	0.211	0.229	0.25	0.214	0.222	0.232	0.25	0.29	0.333	0.343	0.333	0.344	0.32	0.293	0.258	0.23	0.194	0.123	0.127	0.135	0.122	0.137	0.119	0.103	0.08	0.088	0.1	0.109	0.073	0.086	0.079	0.101	0.117	0.085	0.042	0.204		0.239
474	Total																																													

Table 2.2. Test Results by Various Cutoffs of IPO Counts (1985-87)

No. of Ind.	Drop ind. w/ freq <=n Freq.	Drop industries with frequency > n Freq. 23	18	13	7	6	5	4	3	2	1	Mean	Median
117	1	0.118	0.119	0.106	0.092	0.083	0.054	0.056	0.07	0		0.078	0.083
29	2	0.205	0.211	0.189	0.167	0.161	0.111	0.12	0.214			0.172	0.178
14	3	0.2	0.208	0.174	0.136	0.118	0	0				0.119	0.136
11	4	0.357	0.385	0.333	0.273	0.333	0					0.28	0.333
2	5	0.417	0.455	0.4	0.333	0.5						0.421	0.417
4	6	0.375	0.429	0.333	0.2							0.334	0.354
5	7	0.667	1	1								0.889	1
1	13	0.5	1									0.75	0.75
1	18	0										0	0
1	23											0.338	0.333
	Mean	0.315	0.476	0.362	0.2	0.239	0.041	0.059	0.142	0	0.204	0.271	
	Median	0.357	0.407	0.333	0.183	0.161	0.027	0.056	0.142	0	0.161		0.247
185	Total												

Table 2.3. Test Results by Various Cutoffs of IPO Counts (1988-94)

No. of Ind.	Drop ind. w/ freq <=n Freq.	Drop industries with frequency > n Freq. 65	35	28	18	17	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Mean	Mediar
137	1	0.084	0.078	0.079	0.074	0.074	0.075	0.076	0.077	0.072	0.066	0.068	0.063	0.065	0.066	0.069	0.076	0.075	0.044		0.071	0.074
68	2	0.111	0.102	0.103	0.095	0.096	0.099	0.1	0.103	0.094	0.084	0.089	0.08	0.086	0.087	0.095	0.118	0.132			0.098	0.096
38	3	0.098	0.083	0.085	0.07	0.071	0.075	0.077	0.082	0.064	0.044	0.049	0.027	0.031	0.032	0.04	0.077				0.063	0.071
13	4	0.104	0.085	0.087	0.068	0.07	0.075	0.077	0.083	0.059	0.031	0.036	0	0	0	0					0.052	0.068
12	5	0.139	0.114	0.118	0.094	0.097	0.107	0.111	0.125	0.091	0.05	0.063	0	0	0						0.079	0.095
6	6	0.167	0.138	0.143	0.115	0.12	0.136	0.143	0.167	0.125	0.071	0.1	0	0							0.11	0.125
1	7	0.172	0.143	0.148	0.12	0.125	0.143	0.15	0.176	0.133	0.077	0.111	0								0.125	0.138
5	8	0.208	0.174	0.182	0.15	0.158	0.188	0.2	0.25	0.2	0.125	0.25									0.189	0.188
4	9	0.2	0.158	0.167	0.125	0.133	0.167	0.182	0.25	0.167	0										0.155	0.167
4	10	0.25	0.2	0.214	0.167	0.182	0.25	0.286	0.5	0.5											0.283	0.25
2	11	0.214	0.154	0.167	0.1	0.111	0.167	0.2	0.5												0.202	0.167
2	12	0.167	0.091	0.1	0	0	0	0													0.051	0
3	13	0.222	0.125	0.143	0	0	0														0.082	0.063
1	14	0.25	0.143	0.167	0	0															0.112	0.143
3	17	0.4	0.25	0.333	0																0.246	0.292
1	18	0.5	0.333	0.5																	0.444	0.5
2	28	0.5	0																		0.25	0.25
1	35	1																			1	1
1	65																				0.201	0.14
	Mean	0.266	0.14	0.171	0.079	0.088	0.114	0.133	0.21	0.15	0.061	0.096	0.024	0.03	0.037	0.051	0.09	0.104	0.044	0.105	0.153	
	Median	0.204	0.138	0.146	0.094	0.096	0.107	0.127	0.167	0.11	0.066	0.078	0	0.016	0.032	0.054	0.077	0.104	0.044	0.095		0.118
304	Total																					

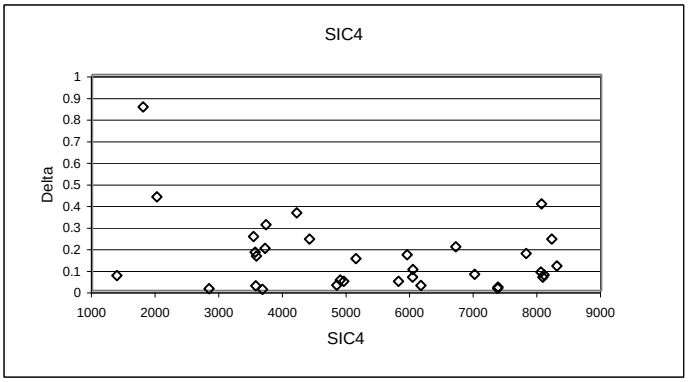
Table 2.4. Test Results by Various Cutoffs of IPO Counts (1995-98)

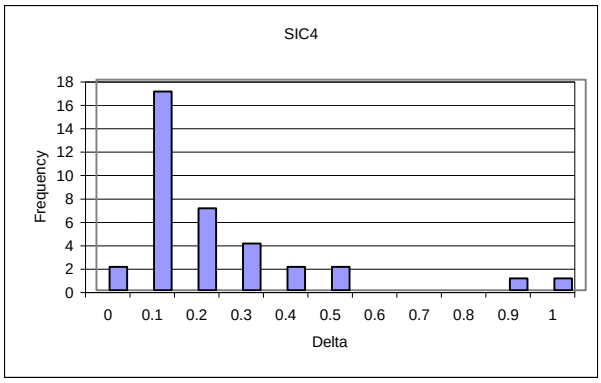
No. of Ind.	Drop ind. w/ freq <=n Freq.	Drop industries with frequency > n: 143	43	42	36	31	28	23	22	21	19	16	15	13	12	11	10	9	8	7	6	5	4	3	2	1	Mean	Mediar
130	1	0.096	0.09	0.09	0.091	0.085	0.085	0.086	0.079	0.08	0.081	0.081	0.082	0.083	0.085	0.078	0.079	0.073	0.076	0.069	0.072	0.057	0.043	0.05	0		0.075	0.081
57	2	0.157	0.148	0.149	0.151	0.141	0.143	0.145	0.134	0.138	0.139	0.141	0.143	0.145	0.151	0.141	0.145	0.136	0.145	0.136	0.148	0.122	0.108	0.174			0.143	0.143
23	3	0.152	0.138	0.141	0.143	0.129	0.131	0.133	0.119	0.123	0.125	0.127	0.13	0.132	0.14	0.125	0.13	0.116	0.128	0.111	0.129	0.077	0				0.122	0.129
14	4	0.192	0.176	0.18	0.184	0.167	0.17	0.174	0.156	0.163	0.167	0.171	0.175	0.179	0.194	0.176	0.188	0.172	0.2	0.182	0.235	0.167					0.179	0.176
12	5	0.2	0.179	0.184	0.189	0.167	0.171	0.176	0.152	0.161	0.167	0.172	0.179	0.185	0.208	0.182	0.2	0.176	0.231	0.2	0.4						0.194	0.181
5	6	0.171	0.147	0.152	0.156	0.129	0.133	0.138	0.107	0.115	0.12	0.125	0.13	0.136	0.158	0.118	0.133	0.083	0.125	0							0.125	0.13
5	7	0.2	0.172	0.179	0.185	0.154	0.16	0.167	0.13	0.143	0.15	0.158	0.167	0.176	0.214	0.167	0.2	0.143	0.333								0.178	0.167
3	8	0.185	0.154	0.16	0.167	0.13	0.136	0.143	0.1	0.111	0.118	0.125	0.133	0.143	0.182	0.111	0.143	0									0.132	0.136
4	9	0.217	0.182	0.19	0.2	0.158	0.167	0.176	0.125	0.143	0.154	0.167	0.182	0.2	0.286	0.2	0.333										0.192	0.182
3	10	0.2	0.158	0.167	0.176	0.125	0.133	0.143	0.077	0.091	0.1	0.111	0.125	0.143	0.25	0											0.133	0.133
2	11	0.222	0.176	0.188	0.2	0.143	0.154	0.167	0.091	0.111	0.125	0.143	0.167	0.2	0.5												0.185	0.167
2	12	0.188	0.133	0.143	0.154	0.083	0.091	0.1	0	0	0	0	0	0													0.069	0.083
3	13	0.231	0.167	0.182	0.2	0.111	0.125	0.143	0	0	0	0	0														0.097	0.118
1	15	0.25	0.182	0.2	0.222	0.125	0.143	0.167	0	0	0	0															0.117	0.143
1	16	0.273	0.2	0.222	0.25	0.143	0.167	0.2	0	0	0																0.145	0.183
1	19	0.3	0.222	0.25	0.286	0.167	0.2	0.25	0	0																	0.186	0.222
1	21	0.333	0.25	0.286	0.333	0.2	0.25	0.333	0																		0.248	0.268
2	22	0.429	0.333	0.4	0.5	0.333	0.5	1																			0.499	0.429
1	23	0.333	0.2	0.25	0.333	0	0																				0.186	0.225
1	28	0.4	0.25	0.333	0.5	0																					0.297	0.333
1	31	0.5	0.333	0.5	1																						0.583	0.5
1	36	0.333	0	0																							0.111	0
1	42	0.5	0																								0.25	0.25
1	43	1																									1	1
1	143																										0.227	0.172
	Mean	0.294	0.174	0.207	0.268	0.134	0.161	0.213	0.075	0.086	0.096	0.109	0.124	0.144	0.215	0.13	0.172	0.113	0.177	0.116	0.197	0.106	0.05	0.112	0	0.145	0.186	
	Median	0.226	0.176	0.183	0.2	0.136	0.143	0.167	0.091	0.111	0.12	0.126	0.133	0.144	0.194	0.133	0.145	0.126	0.145	0.123	0.148	0.1	0.043	0.112	0	0.135		0.153
276	Total																											

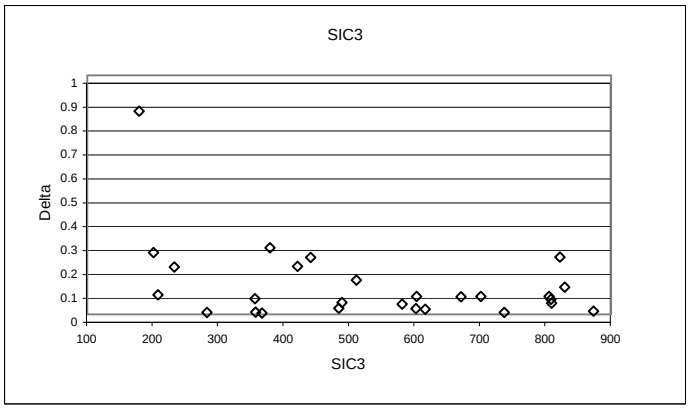
Table 2.5. Test Results by Various Cutoffs of IPO Counts (1999-03)

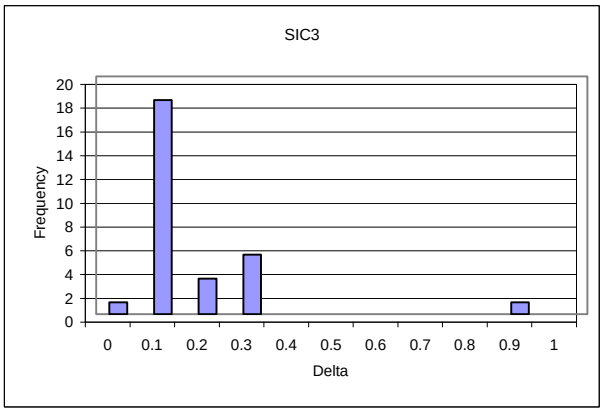
No. of Ind.	Drop ind. w/ freq <=n Freq.	Drop industries with frequency > n: 132	55	32	31	27	26	16	15	14	12	11	10	8	7	6	5	4	3	2	1	Mean	Mediar
64	1	0.037	0.038	0.038	0.039	0.04	0.041	0.042	0.043	0.043	0.044	0.045	0.047	0.048	0.051	0.057	0.061	0.071	0.077	0.071		0.049	0.044
14	2	0.025	0.026	0.026	0.027	0.028	0.029	0.029	0.03	0.031	0.032	0.033	0.034	0.036	0.04	0.048	0.053	0.071	0.083			0.038	0.032
12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				0	0
2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					0	0
5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						0	0
2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0	0
4	7	0	0	0	0	0	0	0	0	0	0	0	0	0								0	0
3	8	0	0	0	0	0	0	0	0	0	0	0	0									0	0
1	10	0	0	0	0	0	0	0	0	0	0	0										0	0
1	11	0	0	0	0	0	0	0	0	0	0											0	0
1	12	0	0	0	0	0	0	0	0	0												0	0
1	14	0	0	0	0	0	0	0	0													0	0
1	15	0	0	0	0	0	0	0														0	0
1	16	0	0	0	0	0	0															0	0
1	26	0	0	0	0	0																0	0
1	27	0	0	0	0																	0	0
1	31	0	0	0																		0	0
1	32	0	0																			0	0
1	55	0																				0	0
1	132																					0.005	0
	Mean	0.003	0.004	0.004	0.004	0.005	0.005	0.005	0.006	0.007	0.008	0.009	0.01	0.012	0.015	0.021	0.028	0.048	0.08	0.071	0.018	0.011	
	Median	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.026	0.071	0.08	0.071	0		0
118	Total																						

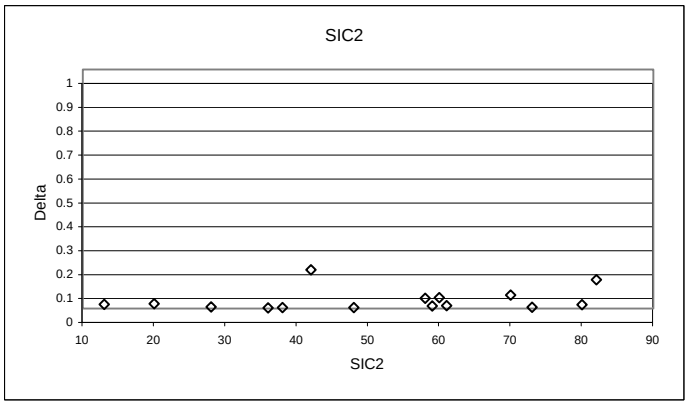
Figure 3. Characteristics of Industries with Differentiation

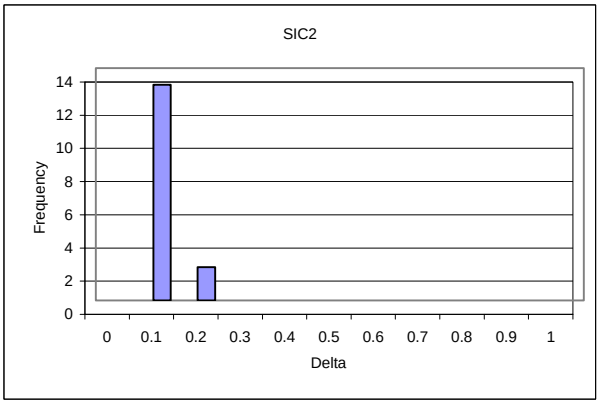












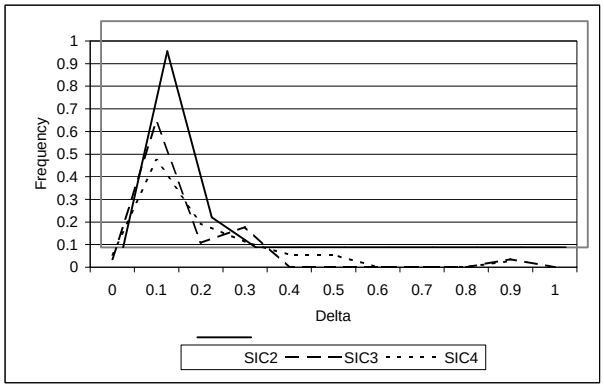


Table 3. Average Levels of Differentiation

	1985-03	1985-87	1988-94	1995-98	1999-03
Differentiation Index (Wt. Average)					
SIC4	0.045	0.207	0.150	0.079	0.075
SIC3	0.026	0.089	0.105	0.044	0.009
SIC2	0.013	0.065	0.057	0.022	0.010

"Kulkarni, Kedar and Tarun Sabarwal (2007): "To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?"
Annals of Finance, 3(3), July, 297-327. Publisher's official version: http://dx.doi.org/10.1007/s10436-006-0054-y.Open Access version: http://kuscholarworks.ku.edu/dspace/.

Appendix

Table A.1. Distribution of Industries by IPOs Counts

SIC3

1985-03			1985-87			1988-94			1995-98			1999-03		
ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop
1	53	0.2023	1	69	0.5036	1	67	0.3472	1	59	0.3391	1	49	0.5765
2	43	0.1641	2	25	0.1825	2	31	0.1606	2	35	0.2011	2	11	0.1294
3	31	0.1183	3	15	0.1095	3	29	0.1503	3	19	0.1092	3	4	0.0471
4	25	0.0954	4	12	0.0876	4	15	0.0777	4	13	0.0747	4	3	0.0353
5	14	0.0534	5	3	0.0219	5	12	0.0622	5	14	0.0805	5	2	0.0235
6	16	0.0611	6	3	0.0219	6	6	0.0311	6	4	0.023	7	4	0.0471
7	9	0.0344	7	4	0.0292	7	6	0.0311	7	6	0.0345	8	2	0.0235
8	4	0.0153	8	1	0.0073	9	6	0.0311	8	1	0.0057	11	1	0.0118
9	5	0.0191	9	1	0.0073	10	4	0.0207	9	5	0.0287	12	2	0.0235
10	9	0.0344	11	1	0.0073	11	2	0.0104	10	2	0.0115	17	1	0.0118
11	5	0.0191	17	1	0.0073	12	2	0.0104	11	1	0.0057	18	1	0.0118
12	2	0.0076	25	1	0.0073	14	2	0.0104	12	2	0.0115	25	1	0.0118
13	3	0.0115	41	1	0.0073	15	2	0.0104	13	2	0.0115	32	1	0.0118
14	1	0.0038				17	2	0.0104	18	1	0.0057	37	1	0.0118
15	3	0.0115				28	1	0.0052	21	1	0.0057	45	1	0.0118
16	1	0.0038				33	1	0.0052	26	1	0.0057	248	1	0.0118
17	2	0.0076				36	1	0.0052	27	1	0.0057			
18	3	0.0115				37	1	0.0052	29	1	0.0057			
19	3	0.0115				43	1	0.0052	30	1	0.0057			
20	7	0.0267				53	1	0.0052	32	1	0.0057			
21	2	0.0076				106	1	0.0052	45	1	0.0057			
22	1	0.0038							56	1	0.0057			
25	1	0.0038							58	1	0.0057			
26	1	0.0038							279	1	0.0057			
27	1	0.0038												
29	1	0.0038												
30	1	0.0038												
33	1	0.0038												
36	2	0.0076												
45	1	0.0038												
47	1	0.0038												
54	2	0.0076												
66	1	0.0038												
71	1	0.0038												
95	1	0.0038												
96	1	0.0038												
105	1	0.0038												
133	1	0.0038												
165	1	0.0038												
658	1	0.0038												
Sum	262	1		137	1		193	1		174	1		85	1

SIC2

1985-03			1985-87			1988-94			1995-98			1999-03		
ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop	ipos(n)	freq (n)	prop
1	4	0.0597	1	14	0.2456	1	9	0.1406	1	3	0.0508	1	14	0.3684
2	2	0.0299	2	9	0.1579	2	7	0.1094	2	9	0.1525	2	5	0.1316
3	3	0.0448	3	4	0.0702	3	1	0.0156	3	4	0.0678	3	1	0.0263
4	1	0.0149	4	5	0.0877	4	4	0.0625	4	5	0.0847	4	3	0.0789
5	1	0.0149	5	2	0.0351	5	3	0.0469	5	2	0.0339	5	1	0.0263
6	1	0.0149	6	5	0.0877	6	6	0.0938	6	8	0.1356	6	3	0.0789
7	4	0.0597	7	1	0.0175	7	4	0.0625	7	5	0.0847	7	1	0.0263
8	4	0.0597	8	3	0.0526	8	1	0.0156	9	4	0.0678	8	1	0.0263
9	2	0.0299	9	1	0.0175	9	4	0.0625	10	1	0.0169	9	1	0.0263
10	2	0.0299	10	1	0.0175	11	1	0.0156	11	1	0.0169	15	1	0.0263
11	1	0.0149	11	2	0.0351	12	2	0.0313	13	1	0.0169	20	1	0.0263
12	1	0.0149	12	2	0.0351	13	1	0.0156	14	1	0.0169	24	1	0.0263
13	1	0.0149	14	1	0.0175	14	2	0.0313	15	1	0.0169	25	1	0.0263
14	2	0.0299	16	2	0.0351	15	1	0.0156	19	1	0.0169	30	1	0.0263
15	3	0.0448	18	1	0.0175	18	2	0.0313	20	2	0.0339	47	1	0.0263
16	2	0.0299	19	1	0.0175	19	1	0.0156	22	1	0.0169	67	1	0.0263
17	1	0.0149	25	1	0.0175	21	1	0.0156	24	2	0.0339	292	1	0.0263
19	1	0.0149	26	1	0.0175	22	1	0.0156	36	1	0.0169			
20	1	0.0149	50	1	0.0175	23	2	0.0313	39	1	0.0169			
22	2	0.0299				24	2	0.0313	40	1	0.0169			
23	2	0.0299				28	1	0.0156	52	1	0.0169			
24	2	0.0299				29	1	0.0156	64	1	0.0169			
29	1	0.0149				39	1	0.0156	89	1	0.0169			
30	1	0.0149				51	1	0.0156	91	1	0.0169			
31	1	0.0149				53	1	0.0156	344	1	0.0169			
33	1	0.0149				55	1	0.0156						
34	1	0.0149				57	1	0.0156						
35	2	0.0299				96	1	0.0156						
36	1	0.0149				126	1	0.0156						
43	1	0.0149												
45	1	0.0149												
50	2	0.0299												
61	1	0.0149												
67	1	0.0149												
80	1	0.0149												
83	1	0.0149												
94	1	0.0149												
111	1	0.0149												
124	1	0.0149												
148	1	0.0149												
173	1	0.0149												
187	1	0.0149												
270	1	0.0149												
787	1	0.0149												
Sum	67	1		57	1		64	1		59	1		38	1

Note: Distribution of SIC4 industries by IPO counts is available in Tables 2.1-2.5.

"Kulkarni, Kedar and Tarun Sabarwal (2007): "To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?" Annals of Finance, 3(3), July, 297-327. Publisher's official version: http://dx.doi.org/10.1007/s10436-006-0054-y.Open Access version: http://kuscholarworks.ku.edu/dspace/.

Table A.2. Test Results Across Industries by Frequency of IPOs

SIC4	Industry Description	1985-2003		1985-1987		1988-1994		1995-1998		1999-2003	
		freq.	exists	freq.	exists	freq.	exists	freq.	exists	freq.	exists
181	Ornamental Floriculture and Nursery Products	2	0								
742	Veterinary Services for Animal Specialties	2	0					2	0		
1041	Gold Ores	5	0	4	0						
1044	Silver Ores	2	0								
1221	Bituminous Coal and Lignite Surface Mining	2	0								
1311	Crude Petroleum and Natural Gas	33	0			17	0	11	0	5	0
1381	Drilling Oil and Gas Wells	4	0			2	0	2	0		
1382	Oil and Gas Field Exploration Services	3	0					2	0		
1389	Oil and Gas Field Services, NEC	9	1			3	0	5	1		
1521	General Contractors-Single-Family Houses	17	0	2	0	9	0	5	0		
1531	Operative Builders	5	0	2	0	3	0				
1629	Heavy Construction, NEC	5	0			3	0				
1731	Electrical Work	4	0					2	0		
1799	Special Trade Contractors, NEC	2	1			2	1				
2015	Poultry Slaughtering and Processing	3	1	3	1						
2026	Fluid Milk	2	0								
2038	Frozen Specialties, NEC	2	0								
2064	Candy and Other Confectionery Products	2	0			2	0				
2068	Salted and Roasted Nuts and Seeds	2	0								
2082	Malt Beverages	5	0					5	0		
2086	Bottled and Canned Soft Drinks and Carbonated	2	0								
2087	Flavoring Extracts and Flavoring Syrups NEC	3	0			3	0				
2095	Roasted Coffee	2	0								
2099	Food Preparations, NEC	2	0								
2211	Broadwoven Fabric Mills, Cotton	5	0			3	0				
2221	Broadwoven Fabric Mills, Manmade Fiber and Si	3	0					2	0		
2231	Broadwoven Fabric Mills, Wool (Including Dyei	2	0								
2253	Knit Outerwear Mills	2	0					2	0		
2325	Men's and Boys' Trousers and Slacks	2	1								
2326	Men's and Boys' Work Clothing	2	0								
2329	Men's and Boys' Clothing, NEC	5	0			2	0	2	0		
2331	Women's, Misses', and Juniors' Blouses and Sh	2	1			2	1				
2335	Women's, Misses', and Juniors' Dresses	2	0			2	0				
2337	Women's, Misses' and Juniors' Suits, Skirts,	4	0			2	0	2	0		
2421	Sawmills and Planing Mills, General	3	0			2	0				
2434	Wood Kitchen Cabinets	2	0								
2451	Mobile Homes	2	0			2	0				
2452	Prefabricated Wood Buildings and Components	2	0								
2511	Wood Household Furniture, Except Upholstered	3	0			2	0				
2514	Metal Household Furniture	2	0								
2631	Paperboard Mills	3	0			2	0				
2675	Die-Cut Paper and Paperboard and Cardboard	2	0								
2676	Sanitary Paper Products	2	0			2	0				
2711	Newspapers: Publishing, or Publishing and Pr	2	0								
2731	Books: Publishing, or Publishing and Printing	3	0					2	0		
2741	Miscellaneous Publishing	2	0	2	0						
2752	Commercial Printing, Lithographic	3	0			2	0				
2759	Commercial Printing, NEC	2	0								
2819	Industrial Inorganic Chemicals, NEC	5	0					4	0		
2821	Plastics Material and Synthetic Resins, and N	2	0								
2833	Medicinal Chemicals and Botanical Products	5	0					4	0		
2834	Pharmaceutical Preparations	88	1	3	0	35	0	23	1	27	0
2835	In Vitro and In Vivo Diagnostic Substances	16	0	2	0	4	0	7	0	3	0
2836	Biological Products, Except Diagnostic Substa	56	0	6	1	13	0	22	0	15	0
2844	Perfumes, Cosmetics, and Other Toilet Prepara	4	0	2	0			2	0		
2869	Industrial Organic Chemicals, NEC	2	0								
2879	Pesticides and Agricultural Chemicals, NEC	4	0	2	0						
2911	Petroleum Refining	2	0			2	0				
3021	Rubber and Plastics Footwear	2	0			2	0				
3081	Unsupported Plastics Film and Sheet	4	0	2	0						
3089	Plastics Products, NEC	6	0			2	0	2	0		
3143	Men's Footwear, Except Athletic	4	0			2	0				
3144	Women's Footwear, Except Athletic	2	0			2	0				
3299	Nonmetallic Mineral Products, NEC	2	0								
3312	Steel Works, Blast Furnaces (Including Coke O	15	0	3	0	11	0				
3316	Cold-Rolled Steel Sheet, Strip, and Bars	2	0			2	0				
3317	Steel Pipe and Tubes	2	0			2	0				
3321	Gray and Ductile Iron Foundries	2	0								
3351	Rolling, Drawing, and Extruding of Copper	3	0			2	0				
3357	Drawing and Insulating of Nonferrous Wire	6	0			2	0	3	0		
3411	Metal Cans	3	0								
3423	Hand and Edge Tools, Except Machine Tools and	4	0					2	0		
3432	Plumbing Fixture Fittings and Trim	2	0	2	0						

3462	Iron and Steel Forgings	2	0					2	0		
3465	Automotive Stamping	2	0								
3469	Metal Stamping, NEC	2	0			2	0				
3523	Farm Machinery and Equipment	4	0			3	0				
3531	Construction Machinery and Equipment	2	0					2	0		
3533	Oil and Gas Field Machinery and Equipment	3	1							2	0
3541	Machine Tools, Metal Cutting Type	2	0								
3555	Printing Trades Machinery and Equipment	4	0					2	0		
3556	Food Products Machinery	2	0								
3559	Special Industry Machinery, NEC	16	0			5	0	10	0		
3561	Pumps and Pumping Equipment	4	1			3	1				
3569	General Industrial Machinery and Equipment, N	2	0								
3571	Electronic Computers	26	1	7	1	10	0	6	0	3	0
3572	Computer Storage Devices	15	0	6	0	4	0	4	0		
3575	Computer Terminals	4	0			3	0				
3577	Computer Peripheral Equipment, NEC	45	0	4	0	17	0	16	0	8	0
3578	Calculating and Accounting Machines, Except E	4	1			3	0				
3585	Air-Conditioning and Warm Air Heating Equipme	2	0	2	0						
3589	Service Industry Machinery, NEC	2	0								
3629	Electrical Industrial Apparatus, NEC	2	0							2	0
3634	Electric Housewares and Fans	7	0			6	0				
3641	Electric Lamp Bulbs and Tubes	2	0					2	0		
3645	Residential Electric Lighting Fixtures	2	0								
3651	Household Audio and Video Equipment	8	0			3	0	3	0		
3652	Phonograph Records and Prerecorded Audio Tape	3	0					3	0		
3661	Telephone and Telegraph Apparatus	47	0	4	0	17	0	12	0	14	0
3663	Radio and Television Broadcasting and Communi	22	0			5	0	11	0	5	0
3669	Communications Equipment, NEC	27	0			14	0	7	0	6	0
3672	Printed Circuit Boards	11	0			4	0	5	0	2	0
3674	Semiconductors and Related Devices	99	1	4	0	28	0	36	1	31	0
3679	Electronic Components, NEC	20	0	4	0	10	0	3	0	3	0
3691	Storage Batteries	6	0			3	0	2	0		
3699	Electrical Machinery, Equipment, and Supplies	3	0					2	0		
3713	Truck and Bus Bodies	3	0			3	0				
3714	Motor Vehicle Parts and Accessories	11	0			5	0	6	0		
3715	Truck Trailers	3	1			3	0				
3724	Aircraft Engines and Engine Parts	3	0					2	0		
3728	Aircraft Parts and Auxiliary Equipment, NEC	3	1					3	1		
3731	Ship Building and Repairing	4	0					4	0		
3743	Railroad Equipment	3	0			3	0				
3751	Motorcycles, Bicycles, and Parts	7	0			3	0	3	0		
3792	Travel Trailers and Campers	2	0			2	0				
3812	Search, Detection, Navigation, Guidance, Aero	4	0			3	0				
3823	Industrial Instruments for Measurement, Displ	8	0	2	0	3	0	2	0		
3825	Instruments for Measuring and Testing of Elec	9	0			3	0	4	0	2	0
3826	Laboratory Analytical Instruments	19	0			4	0	10	1	5	0
3827	Optical Instruments and Lenses	7	0					3	0	3	0
3829	Measuring and Controlling Devices, NEC	9	0			2	0	7	0		
3841	Surgical and Medical Instruments and Apparatu	44	0			13	0	28	0	2	0
3842	Orthopedic, Prosthetic, and Surgical Applianc	14	0			6	0	5	0	3	0
3844	X-Ray Apparatus and Tubes and Related Irradia	5	0			2	0	2	0		
3845	Electromedical and Electrotherapeutic Apparat	41	0	2	0	12	0	22	0	5	0
3851	Ophthalmic Goods	6	0					5	0		
3861	Photographic Equipment and Supplies	4	0			2	0				
3911	Jewelry, Precious Metal	2	0								
3942	Dolls and Stuffed Toys	2	0					2	0		
3944	Games, Toys, and Children's Vehicles, Except	7	0	2	0	3	0	2	0		
3949	Sporting and Athletic Goods, NEC	10	0			8	0				
3955	Carbon Paper and Inked Ribbons	2	0			2	0				
3999	Manufacturing Industries, NEC	4	0			2	0	2	0		
4011	Railroads, Line-haul Operating	3	0			2	0				
4119	Local Passenger Transportation, NEC	3	0			2	0				
4212	Local Trucking Without Storage	2	0								
4213	Trucking, Except Local	22	1	6	1	12	1	4	0		
4215	Courier Services Except by Air	5	0					4	0		
4226	Special Warehousing and Storage, NEC	2	0					2	0		
4412	Deep Sea Foreign Transportation of Freight	3	1			2	1				
4499	Water Transportation Services, NEC	3	0								
4512	Air Transportation, Scheduled	10	0	2	0	5	0	2	0		
4522	Air Transportation, Nonscheduled	4	0					3	0		
4724	Travel Agencies	5	0					2	0	3	0
4731	Arrangement of Transportation of Freight and	6	0					3	0		
4812	Radiotelephone Communications	30	0	2	0	13	0	8	0	7	0
4813	Telephone Communications, Except Radiotelepho	36	0	3	0	4	0	19	0	10	0
4822	Telegraph and Other Message Communications	2	1								
4832	Radio Broadcasting Stations	12	0			7	0			3	0
4833	Television Broadcasting Stations	8	0	3	0	3	0	2	0		
4841	Cable and Other Pay Television Services	21	1	7	0	9	1	3	0	2	0
4899	Communications Services, NEC	15	1			3	0	5	1	7	0
4911	Electric Services	5	0	3	0						

4922	Natural Gas Transmission	3	0			2	0				
4923	Natural Gas Transmission and Distribution	2	0								
4931	Electric and Other Services Combined	2	0								
4952	Sewerage Systems	2	0								
4953	Refuse Systems	17	1	2	0	8	0	6	0		
5012	Automobiles and Other Motor Vehicles	2	0			2	0				
5013	Motor Vehicle Supplies and New Parts	3	0					2	0		
5021	Furniture	2	0			2	0				
5031	Lumber, Plywood, Millwork, and Wood Panels	2	0								
5044	Office Equipment	2	0								
5045	Computers and Computer Peripheral Equipment a	11	0	2	0	4	1	4	0		
5047	Medical, Dental, and Hospital Equipment and S	6	0			3	0	2	0		
5051	Metals Service Centers and Offices	2	0								
5063	Electrical Apparatus and Equipment Wiring Sup	2	0								
5064	Electrical Appliances, Television and Radio S	2	0	2	0						
5065	Electronic Parts and Equipment, NEC	4	0			2	0				
5072	Hardware	2	0								
5084	Industrial Machinery and Equipment	3	0					3	0		
5085	Industrial Supplies	2	0					2	0		
5091	Sporting and Recreational Goods and Supplies	4	0			2	0	2	0		
5092	Toys and Hobby Goods and Supplies	2	0								
5093	Scrap and Waste Materials	2	0								
5099	Durable Goods, NEC	3	0								
5112	Stationery and Office Supplies	3	0					3	0		
5141	Groceries, General Line	5	1			3	0	2	0		
5149	Groceries and Related Products, NEC	3	0					2	0		
5159	Farm-Product Raw Materials, NEC	2	0			2	0				
5191	Farm Supplies	2	0			2	0				
5192	Books, Periodicals, and Newspapers	3	0	2	0						
5193	Flowers, Nursery Stock, and Florists' Supplie	2	0								
5211	Lumber and Other Building Materials Dealers	4	0			4	0				
5251	Hardware Stores	4	0			3	0				
5261	Retail Nurseries, Lawn and Garden Supply Stor	3	0			2	0				
5311	Department Stores	5	0			3	0				
5331	Variety Stores	6	0	2	0			3	0		
5399	Miscellaneous General Merchandise Stores	6	0	3	0	2	0				
5411	Grocery Stores	13	0	7	0	5	0				
5499	Miscellaneous Food Stores	4	0					2	0		
5511	Motor Vehicle Dealers (New and Used)	5	0					5	0		
5521	Motor Vehicle Dealers (Used Only)	2	0			2	0				
5531	Auto and Home Supply Stores	7	0	2	0	5	0				
5551	Boat Dealers	2	0								
5611	Men's and Boys' Clothing and Accessory Stores	4	0			4	0				
5621	Women's Clothing Stores	12	0	4	0	6	0				
5641	Children's and Infants' Wear Stores	3	0			2	0				
5651	Family Clothing Stores	8	0	3	0	3	1	2	0		
5661	Shoe Stores	5	0			3	0				
5699	Miscellaneous Apparel and Accessory Stores	2	0								
5712	Furniture Stores	6	0	2	0	3	0				
5719	Miscellaneous Homefurnishings Stores	3	0			2	0				
5722	Household Appliance Stores	3	0	3	0						
5731	Radio, Television, and Consumer Electronics S	7	0	3	0	2	0				
5734	Computer and Computer Software Stores	5	0			2	0	2	0		
5735	Record and Prerecorded Tape Stores	6	0	3	0			2	0		
5812	Eating and Drinking Places	45	1			28	1	9	0	7	0
5912	Drug Stores and Proprietary Stores	8	0	2	0	3	1			2	0
5932	Used Merchandise Stores	2	0								
5941	Sporting Goods Stores and Bicycle Shops	6	0			3	0			2	0
5942	Book Stores	4	0					2	0		
5943	Stationery Stores	3	0			3	0				
5944	Jewelry Stores	6	0	2	0	2	0	2	0		
5945	Hobby, Toy, and Game Shops	5	0							2	0
5947	Gift, Novelty, and Souvenir Shops	6	1			2	0			3	1
5961	Catalog and Mail-Order Houses	25	0	5	0	3	1	9	0	8	0
5999	Miscellaneous Retail Stores, NEC	10	0			4	0	3	0	2	0
6021	National Commercial Banks	9	0	2	0			3	0	3	0
6022	State Commercial Banks	16	0	7	0	2	0	6	1		
6035	Savings Institutions, Federally Chartered	30	1	23	0	5	0	2	0		
6036	Savings institutions, Not Federally Chartered	24	1	18	1	4	0	2	0		
6099	Functions Related to Deposit Banking, NEC	3	0								
6141	Personal Credit Institutions	17	0			6	0	10	0		
6159	Miscellaneous Business Credit Institutions	6	0					4	0		
6162	Mortgage Bankers and Loan Correspondents	25	1			11	1	9	0	4	0
6211	Security Brokers, Dealers, and Flotation Comp	15	0	6	0	2	0	5	0	2	0
6282	Investment Advice	7	0	4	0	2	0				
6311	Life Insurance	20	0	7	0	5	0	7	0		
6324	Hospital and Medical Service Plans	17	0			10	0	5	0	2	0
6331	Fire, Marine, and Casualty Insurance	20	0	4	0	9	0	5	0	2	1
6351	Surety Insurance	7	0			3	0	3	0		
6371	Pension, Health, and Welfare Funds	2	0			2	0				

6411	Insurance Agents, Brokers, and Service	7	0			2	0	4	0		
6512	Operators of Nonresidential Buildings	2	0								
6531	Real Estate Agents and Managers	2	0					2	0		
6552	Land Subdividers and Developers, Except Cemet	2	0	2	0						
6712	Offices of Bank Holding Companies	7	1					3	1	3	0
6719	Offices of Holding Companies, NEC	3	0					2	0		
6722	Management Investment Offices, Open-End	2	0	2	0						
7011	Hotels and Motels	20	1	3	0	5	0	12	1		
7021	Rooming and Boarding Houses	2	0					2	0		
7231	Beauty Shops	2	0								
7261	Funeral Services and Crematories	3	0			2	0				
7311	Advertising Agencies	10	0					3	0	6	0
7312	Outdoor Advertising Services	2	0					2	0		
7319	Advertising, NEC	3	0					2	0		
7322	Adjustment and Collection Services	2	0								
7331	Direct Mail Advertising Services	6	0			3	0	3	0		
7352	Medical Equipment Rental and Leasing	2	0			2	0				
7359	Equipment Rental and Leasing, NEC	10	0			2	0	7	0		
7361	Employment Agencies	3	0							3	0
7363	Help Supply Services	17	0			4	0	13	0		
7371	Computer Programming Services	58	0			5	0	42	0	11	0
7372	Prepackaged Software	353	1	13	1	65	1	143	1	132	0
7373	Computer Integrated Systems Design	91	0	4	0	18	0	43	0	26	0
7374	Computer Processing and Data Preparation and	32	0	5	0	6	0	13	0	8	0
7375	Information Retrieval Services	84	1			8	0	21	0	55	0
7376	Computer Facilities Management Services	3	0					2	0		
7378	Computer Maintenance and Repair	2	0			2	0				
7379	Computer Related Services, NEC	34	0			2	0	15	0	16	0
7381	Detective, Guard, and Armored Car Services	2	0			2	0				
7382	Security Systems Services	2	0								
7389	Business Services, NEC	67	0			4	0	31	0	32	0
7514	Passenger Car Rental	3	0	2	0						
7549	Automotive Services, Except Repair and Carwas	2	0								
7812	Motion Picture and Video Tape Production	7	0	3	1	2	0	2	0		
7819	Services Allied to Motion Picture Production	4	1			2	0				
7822	Motion Picture and Video Tape Distribution	3	0			2	0				
7832	Motion Picture Theaters, Except Drive-In	3	0			2	0				
7841	Video Tape Rental	5	0					2	0		
7941	Professional Sports Clubs and Promoters	2	0								
7948	Racing, Including Track Operations	4	0					4	0		
7993	Coin-Operated Amusement Devices	2	0								
7999	Amusement and Recreation Services, NEC	5	0			3	0	2	0		
8011	Offices and Clinics of Doctors of Medicine	18	0	4	0	9	0	5	0		
8021	Offices and Clinics of Dentists	2	0					2	0		
8042	Offices and Clinics of Optometrists	2	0								
8051	Skilled Nursing Care Facilities	14	1			10	0	3	1		
8059	Nursing and Personal Care Facilities, NEC	5	1					5	1		
8062	General Medical and Surgical Hospitals	8	0	3	1	2	0	3	1		
8069	Specialty Hospitals, Except Psychiatric	5	0			5	0				
8071	Medical Laboratories	10	0			6	0			2	0
8082	Home Health Care Services	9	1			3	0	4	0		
8092	Kidney Dialysis Centers	4	0			2	0				
8093	Specialty Outpatient Facilities, NEC	12	0	2	0	5	0	4	0		
8099	Health and Allied Services, NEC	20	1			8	0	8	1	3	0
8221	Colleges, Universities, and Professional Scho	4	1					2	0		
8299	Schools and Educational Services, NEC	13	1			3	1	3	0	7	0
8351	Child Day Care Services	3	0					2	0		
8361	Residential Care	4	0					4	0		
8711	Engineering Services	9	0	4	0	4	0				
8721	Accounting, Auditing, and Bookkeeping Service	2	0								
8731	Commercial Physical and Biological Research	34	0			8	0	13	0	12	0
8732	Commercial Economic, Sociological, and Educat	10	0			2	0	3	0	5	0
8734	Testing Laboratories	3	0					2	0		
8741	Management Services	13	0			3	0	9	0		
8742	Management Consulting Services	14	0			2	0	8	0	4	0
8744	Facilities Support Management Services	3	0					2	0		
8748	Business Consulting Services, NEC	6	0	2	0	2	0	2	0		

Notes

1 freq. = frequency of moderate-sized IPOs

2 exists = 1 iff differentiation exists

3 No entry iff number of IPOs <= 1 (test is not defined)

"Kulkarni, Kedar and Tarun Sabarwal (2007): "To What Extent Are Investment Bank-Differentiating Factors Relevant For Firms Floating Moderate-Sized IPOs?"
Annals of Finance, 3(3), July, 297-327. Publisher's official version: http://dx.doi.org/10.1007/s10436-006-0054-y.Open Access version: http://kuscholarworks.ku.edu/dspace/.

Table A.3. Details For Industries With Differentiation (SIC4 and SIC3)

SIC4

1985-2003			1985-87			1988-94			1995-98			1999-03		
SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta
1389	9	0.07	2015	3	0.517	1799	2	0.775	1389	5	0.22	5947	3	0.5065
1799	2	0.85	2836	6	0.146	2331	2	1.151	2834	23	0.029	6331	2	-0.573
2015	3	0.433	3571	7	0.25	3561	3	0.255	3674	36	0.028			
2325	2	-0.59	4213	6	0.278	4213	12	0.435	3728	3	0.319			
2331	2	1.113	6036	18	0.085	4412	2	1.032	3826	10	0.065			
2834	88	0.009	7372	13	0.196	4841	9	0.088	4899	5	0.598			
3533	3	0.251	7812	3	0.457	5045	4	0.182	6022	6	0.274			
3561	4	0.177	8062	3	0.294	5651	3	0.264	6712	3	0.483			
3571	26	0.023				5812	28	0.076	7011	12	0.136			
3578	4	0.159				5912	3	0.513	7372	143	0.022			
3674	99	0.006				5961	3	0.369	8051	3	0.34			
3715	3	0.196				6162	11	0.085	8059	5	0.363			
3728	3	0.306				7372	65	0.024	8062	3	0.229			
4213	22	0.36				8299	3	0.352	8099	8	0.283			
4412	3	0.238												
4822	2	-0.42												
4841	21	0.025												
4899	15	0.049												
4953	17	0.043												
5141	5	0.148												
5812	45	0.043												
5947	6	0.165												
6035	30	0.063												
6036	24	0.097												
6162	25	0.024												
6712	7	0.203												
7011	20	0.075												
7372	353	0.011												
7375	84	0.017												
7819	4	0.172												
8051	14	0.085												
8059	5	0.401												
8082	9	0.062												
8099	20	0.073												
8221	4	0.239												
8299	13	0.114												
Wt. Average		0.045			0.207			0.15			0.079			0.0746

SIC3

1985-2003			1985-87			1988-94			1995-98			1999-03		
SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta
179	2	0.85	201	4	0.313	179	2	0.775	208	6	0.104	283	45	0.024
201	4	0.258	421	6	0.278	233	7	0.279	283	56	0.016	594	8	0.098
208	11	0.082	603	41	0.03	314	5	0.172	331	3	0.279	633	2	-0.57
233	9	0.198	737	25	0.105	346	3	0.448	367	45	0.017	731	7	0.154
283	165	0.008				357	37	0.022	489	5	0.598	737	248	0.004
356	10	0.066				379	3	0.283	573	5	0.26			
357	95	0.009				421	14	0.39	602	9	0.201			
367	133	0.005				441	2	1.032	603	4	0.165			
379	3	0.278				484	9	0.088	701	12	0.136			
421	29	0.2				565	3	0.264	737	279	0.013			
441	3	0.238				581	28	0.076	805	8	0.198			
482	2	-0.42				591	3	0.513	806	3	0.229			
484	21	0.025				596	4	0.223	809	13	0.174			
489	15	0.049				616	11	0.085						
511	4	0.144				737	106	0.021						
581	45	0.043				829	3	0.352						
602	25	0.024												
603	54	0.075												
616	26	0.021												
671	10	0.074												
701	20	0.075												
737	658	0.008												
805	20	0.076												
808	9	0.062												
809	36	0.047												
822	4	0.239												
829	13	0.114												
873	47	0.014												
Wt. Average		0.026			0.089			0.105			0.044			0.009

Note: Descriptions of SIC4 industries are available in Table A.1

Table A.4. Details For Industries With Differentiation (SIC2)

SIC2

1985-2003			1985-87			1988-94			1995-98			1999-03		
SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta	SIC	Freq	Delta
13	50	0.018	42	6	0.278	15	12	0.066	20	9	0.079	28	47	0.019
20	33	0.02	60	50	0.02	17	2	0.775	28	64	0.014	73	292	0.003
28	187	0.006	73	25	0.105	22	7	0.101	42	11	0.074	80	8	0.089
36	270	0.002				31	5	0.172	56	6	0.11	82	9	0.13
38	173	0.004				42	14	0.39	57	7	0.119			
42	31	0.161				56	19	0.058	60	15	0.112			
48	124	0.005				58	28	0.076	65	4	0.203			
58	45	0.043				61	18	0.039	70	14	0.115			
59	80	0.011				73	126	0.011	73	344	0.005			
60	83	0.045				80	51	0.017	80	36	0.038			
61	50	0.012				82	4	0.172						
70	23	0.057												
73	787	0.006												
80	111	0.016												
82	20	0.121												
Wt. Average		0.013			0.065			0.057			0.022			0.01

Descriptions of SIC2 Industries Listed Above

13 Oil and gas extraction
15 General building contractors
17 Special trade contractors
20 Food and kindred products
22 Textile mill products
28 Chemicals and allied products
31 Leather and leather products
36 Electrical and electronic equipment
38 Instruments and related products
42 Motor freight transportation and warehousing
48 Communications
56 Apparel and accessory stores
57 Furniture, home furnishings and equipment stores
58 Eating and drinking places
59 Miscellaneous retail
60 Depository institutions
61 Nondepository credit institutions
65 Real estate
70 Hotels, rooming houses, camps, and other lodging places
73 Business services
80 Health services
82 Educational services