Future Industrial Organization and Stock Returns versus the Decision to Issue IPOs *

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January 27, 2005

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ABSTRACT

We find that IPOs issued in more competitive, and more highly leveraged, industries underperform in the three years following their issuance. Both results are economically large, and are robust to numerous controls. We conduct several tests to trace the economic sources of this underperformance. Although explanations are not mutually exclusive, our evidence most strongly supports an explanation based on the information content of IPOs: observing the decision to issue an IPO reveals information about an industry's future organization, and investors ignore this information when valuing firms. The logic is along the lines of Myers and Majluf (1984), and it suggests that a simple corporate financing decision (issuing an IPO) may contain value-relevant information about an entire industry's future organization. This embedded information is relevant to both IPO firms and existing firms alike.

Many researchers believe that competitive industry conditions can impact financial structures.[1] Our paper explores whether activity in the IPO market contains information regarding an industry's future organization, and whether this information is correctly priced.[2] We examine a large sample of IPOs issued from 1984 to 2000, and find that IPOs in the highest industry concentration quartile experience three-year post-IPO abnormal returns of –26.2%, compared to +14.9% for those in the lowest quartile. This 42.1% difference is statistically significant at the 1% level, robust to four different asset pricing models (both in event time and calendar time, and against different benchmark returns), and to inclusion or exclusion of the late 1990s.[3] Moreover, this result is economically large, and its corresponding 12% annual return exceeds even the equity premium observed during this time.

In addition to reporting this novel finding, we conduct several tests to explore its economic sources. We examine both rational explanations, and explanations based on behavioral theory. Although possible explanations are not mutually exclusive, and more than one may apply, our evidence most strongly supports a mispricing explanation based on the information content of IPO issuance: observing the decision to issue an IPO reveals information about future industrial organization, and investors systematically overlook this information. This explanation becomes especially clear from the industrial organization perspective.

It is well known among scholars of industrial organization that firms in concentrated industries face less competition from rivals, and typically enjoy relatively high profit margins. In practice, high profit margins can only persist in equilibrium when rivals cannot enter due to (1) high costs of entry, (2) economies of scale, or (3) legal

[1]Early theory developed by Brander and Lewis (1986) and Maksimovic (1988) studies the interaction between existing firms in concentrated industries. Later theory presented by Maksimovic and Zechner (1991), Williams (1995), and Fries, Miller, and Perraudin (1997) shows that, in competitive industries, firms also account for the collective actions of their industry peers when making real and financial decisions. Chevalier (1995) and Phillips (1995) provide empirical evidence of this link between financial structures and product markets. MacKay and Phillips (2003) find empirical support for the aforementioned competitive industry models of financial structure.

[2]We are aware of only one existing paper that touches upon this link: Benninga, Helmantel, and Sarig (2003) model a firm's decision to go public and to re-privatize. One implication of their model is that IPOs tend to cluster in industries because firm-level cash flows are more correlated within industries.

[3]Although more noise is added when the late 1990s are included, the difference is still exceeds 40%. Moreover, this difference is significant at the 1% level with or without the late 1990s.

(i.e. patent) protection. Hence, high profit equilibria can be unstable in a dynamic economy, and observing successful entry should alert investors to the possible collapse of these long-standing barriers to entry.[4] Because the removal of barriers to entry permits rivals to enter (perhaps in larger numbers), investors should downwardly revise their beliefs about future profits, and drive down stock prices after observing entry in a concentrated industry. This price correction should be large, as successful entry by even a single firm likely implies that several additional firms may soon enter, so the expected increase in competition can be dramatic.

From a theoretical perspective, this logic mirrors Myers and Majluf (1984), who show that observing a corporate finance decision (i.e. issuing equity) contains value-relevant information about a firm's growth options. In our case, a similar corporate financing decision (issuing an IPO) contains value-relevant information about an entire industry, not just a single firm. If investors ignore this industry-wide information, the aforementioned downward price correction would be delayed, and would appear as negative long-term abnormal returns. Our empirical results fully support the notion that investors overlook this information: (1) IPOs in concentrated industries experience inferior long-term abnormal performance, (2) existing public firms in these same industries underperform by just as much as the IPO firms, (3) Concentrated industries experiencing zero IPOs do not underperform, and (4) IPO volume is higher in concentrated industries (consistent with the expectation of multiple entrants when barriers to entry fail).

Given well-known facts regarding how today's investors value firms, it is easy understand why this information may be overlooked. Arkebauer and Schultz (1991) and Purnanandam and Swaminathan (2004) suggest that underwriters and investors alike value firms using comparable firm ratios. One feature is that these ratios are based on current profit levels (primarily due to availability). Hence, investors using ratios to value IPO firms (in concentrated industries) are assuming that they will enjoy the same high profit margins enjoyed by existing firms prior to the failure of the barriers to entry. This form of valuation error would later correct over time in

[4]For example, technological innovation or changes in the legal environment can render patents to be irrelevant, lower the costs of entry, or destroy economies of scale.

the form of negative abnormal returns, which is exactly what we observe.

Although the "unpriced information" hypothesis receives most support, possible explanations are not mutually exclusive, and a risk-based explanation cannot be ruled out. The most plausible is motivated by Gort and Klepper (1982), Jovanovic (1982), Klepper and Grady (1990), Klepper (1996), and Maksimovic and Phillips (2004) among others, who suggest that industries go through life cycles. In bad times, competitive industries are more likely to consolidate, and firms are more likely to become distressed. Hence, firms in competitive industries may be exposed to (systematic) macroeconomic risk, and firms in concentrated (non-competitive) industries may be hedges to this risk. This explanation would (correctly) predict that firms in competitive industries will have higher expected returns than firms in concentrated industries. However, this explanation has difficulty explaining why the underperformance we report is conditional on IPOs being issued, and why IPO volume is also linked to industry concentration.

Since Ritter (1991)'s seminal paper, a few studies have identified variables that can predict long-term performance in cross section. For example, Carter, Dark, and Singh (1998) show that IPOs underwritten by higher prestige underwriters, and Jain and Kini (1994) show that issuers who retain larger equity shares, experience superior performance. Ritter (1991) and Lowry (2003) show that IPO volume matters, and Krigman, Shaw, and Womack (1999) and Houge, Loughran, Suchanek, and Yan (2001) show that the level of flipping by institutional investors matters. Teoh, Welch, and Wong (1998) show that long-term performance is related to the level of earnings manipulation. We control for several of these results and document that our industry concentration and industry leverage effects are unique.

The rest of the paper is organized as follows. In section I, we introduce our empirical setup. Section II examines IPO underpricing and identifies the sources of industry effects. Section III presents results for long-term IPO performance. Section IV considers IPO volume, and section V concludes.

I Data and Methodology

A Data Source

IPO data are from the Securities Data Company (SDC) U.S. New Issues Database. The sample initially consists of all U.S. IPOs issued between January 1, 1984 and December 31, 2000. We eliminate ADRs, unit issues, REITs, financial firms, and firms with offer prices less than five dollars. An IPO's industry is identified by its three-digit SIC code, as reported by CRSP. 4,980 IPO observations remain in 324 industries. On average, 92 of the 324 industries experience at least one IPO in a given year. The subsequent IPO stock performance data and firm financial data are from CRSP and COMPUSTAT respectively. Throughout this section, we use "existing public firms" to refer to the set of non-IPO firms existing in the CRSP and COMPUSTAT databases for at least one full year.

B Long-Term Performance

In light of views presented in Ritter and Welch (2002),[5] we construct long-term abnormal returns using many asset pricing models to ensure the robustness of our results. Since Ritter (1991), buy-and-hold abnormal returns have been a mainstay for researchers measuring long-term performance. Barber and Lyon (1997) refine this method and advocate style-matched buy-and-hold abnormal returns. In contrast, Fama (1998) argues that formal inferences about long-term returns should be based on cumulative abnormal returns because the buy-and-hold method exacerbates the "bad-model problem".[6] Schultz (2001) suggests that calendar time portfolios, which weight each time period equally (rather than each IPO equally), should be examined to control for bias associated with pseudo-market-timing. Our study does not take a stand on which methodology, and which asset pricing model is preferable. Rather, to ensure robustness, we (1) present results using five different asset pricing models

[5]The authors argue that results concerning long-term performance often depend on specific asset pricing models.

[6]As famously argued by Fama (1998), any test for market efficiency is also a joint test of the underlying asset pricing model. This is referred to as the "bad model problem".

including one based on calendar time, and (2) present results for samples that include and exclude the late 1990s. We summarize the methodology as follows.

Raw Buy and Hold Return: An IPO's raw buy and hold return is the total return realized by an investor who purchases shares at the closing price on the first day of public trading, and then sells them on the earlier of (1) its three year anniversary, or (2) the date on which the firm exits the CRSP database.

Style Matched Buy and Hold Abnormal Returns: Raw buy and hold return minus the buy and hold return of a style matched portfolio. Style-matched portfolios are based on 10 size and 5 book to market NYSE breakpoints. The same breakpoints also identify which portfolio is assigned to a given IPO. We obtain IPO market value and book values using information that is fully known by the IPO date. An IPO's market value is its number of shares (including primary and secondary) times its IPO price. Its book value is obtained from one of two sources: (1) 40% have COMPUSTAT data available prior to the IPO date, and (2) the SDC database lists the book value of equity (including new IPO proceeds) for the remaining 60%.

Style Matched Cumulative Abnormal Returns: We use the same matching methodology as above. However, this method is based on the sum of the 36 monthly IPO returns less the sum of the 36 matched portfolio returns. When a firm exits the database early, the sum only includes the available observations.

Style Matched Calendar Time Abnormal Returns: We use the same matching methodology as above. However, this method assigns each IPO to a portfolio based its industry's ex-ante concentration or leverage. Each portfolio's monthly return is the equal weighted average over the IPOs included in its definition. To test whether calendar time returns are significant, we apply statistical tests to each portfolio's monthly returns, not to individual IPO returns. Firms enter calendar time portfolios in the month of their IPO, and exit after their third anniversary.

Fama-French Three Factor Abnormal Returns: We compute the intercept of a time series regression of each IPO's monthly returns (less the riskless rate) on the three Fama and French (1993) factors: market factor, the HML factor, and the SMB factor.[7]

Industry Adjusted Buy and Hold Abnormal Returns: This quantity is equal to an IPO's raw return less the average buy and hold return of all existing public firms in the given IPO's three digit SIC industry.

C Explanatory Variables

To study the role of industry conditions in the IPO market, we construct industry-specific averages of variables that are related to industrial organization, and to corporate financing decisions such as capital structure. Although not critical to our results, industry averages can be viewed as proxies (or targets) for the values associated with the IPO firms themselves.

The industry characteristics (such as industry leverage or book-to-market) used in our study are averages over existing public firms in a given three-digit SIC code. For an IPO issued in year t, these averages are taken over data from each existing firm's fiscal year that ends in the twelve-month period between July of year t-2 to June of year t-1. This conservative lagging structure ensures that all data used to predict IPO variables are at least six months old, and thus public information. We consider the following industry conditions:[8]

Leverage Ratio: We identify a firm's outstanding debt as the sum of its book value of short-term debt [COMPUSTAT 9] and long-term debt [COMPUSTAT 34]. Its equity is its CRSP market capitalization at the end of its fiscal year. A firm's leverage ratio is its debt divided by its debt plus equity. An industry's leverage ratio is the equal-weighted average over its existing public firms.

[7]Not reported, we also include momentum in an additional specification. It does not change our results.

[8]In addition to the industry averages listed, we also test tax variables such as Graham's modified tax rate (see Graham 2000). Tax variables are not presented because they are not relevant in predicting IPO performance or IPO volume.

Log of Book-to-Market: A firm's book-to-market ratio is its book value of equity [COMPUSTAT 60] plus balance sheet deferred taxes [COMPUSTAT 35], all divided by its CRSP market capitalization at the end of its fiscal year. An industry's book-to-market ratio is the equal-weighted average over its existing public firms. Rajan and Zingales (1995) show that the book-to-market ratio is related to capital structure.

Profitability (Income-to-Sales Ratio): Profitability is the ratio of operating income [COMPUSTAT 13] divided by sales [COMPUSTAT 12]. After winsorizing at the 10% level in each year, an industry's income-to-sales ratio is the equal-weighted average over its existing public firms. Shyam-Sunder and Myers (1999) document that profitability is related to capital structure.

Sales-weighted industry concentration (HHI): Concentration is computed as the Herfindahl Index (sum of squared market shares) based on all existing public firms. A firm's market share is its sales [COMPUSTAT 12] divided by the total sales of all existing public firms in the given industry. Each firm's COMPUSTAT sales are from its fiscal year that ends between July of year t-2 and June of year t-1.

Size-weighted industry concentration (HHI): Concentration is computed as the Herfindahl Index (sum of squared market shares) based on the market capitalization of all existing public firms. Each firm's market share is its CRSP market capitalization divided by the total market capitalization of all existing public firms in its given industry. Because CRSP market capitalization data are available on a monthly basis, for consistency, we base this calculation on data from the December of year t-2.

Log of Firm Market Cap: A firm's market capitalization is its CRSP market capitalization the December of year t-2. To control for growing firm size throughout the sample, each value is scaled by the value of the S&P index at the start of the given year.[9]

[9]Results do not change if sizes are not normalized by the S&P index level.

Prior IPO Volume: The total number of IPOs completed in the given industry in year t-1, divided by the number of existing public firms in the given industry at the end of year t-2.

Equity Volatility: A firm's equity volatility is the standard deviation of its twelve monthly stock returns from July of year t-2 to June of year t-1. An industry's equity volatility is the equal-weighted average over all existing public firms.

Share Turnover: For a given firm, share turnover is the average of its twelve monthly observations of share volume from July of year t-2 to June of year t-1, divided by shares outstanding at the end of year t-2. An industry's share turnover is the equal-weighted average over all existing public firms. Gervais, Kaniel and Mingelgrin (2001), among others, show that trading volume can predict returns, so we include it as a control.

Prior Returns: A firm's prior return is its realized CRSP return in year t-1. An industry's prior return is the equal-weighted average over its existing public firms.

The measures of industry concentration used in our study are based on public firms only due to limited data availability (sales and market value data are not available for privately held firms). We believe concentration based on public firms alone should be representative of an industry's overall concentration. In addition, the observation of a private firm going public can be viewed as a proxy for entry because (1) IPO firms typically sell both primary and secondary shares, thus expanding the overall size of the IPO firm within its industry. (2) Observed IPOs indicate an industry is expanding, and this event is likely correlated with the entry of additional private firms. In either case, industry concentration should decline when IPOs are issued, and the concentration of public firms alone is a reasonable proxy for an industry's true concentration.

Our study focuses on the predictability of after market IPO stock performance in the three years after issuance. Hence, we also control for the following variables, which are identified in the existing literature as known predictors of long-term per-

formance:

CMrank: Carter Manaster Rank from Carter, Dark, and Singh (1998), and updated by Jay Ritter. This measure of underwriter quality was first employed in Carter and Manaster (1990), and Carter, Dark, and Singh (1998) show that this variable is a significant predictor of long-term IPO performance.

Overhang: Shares retained by the entrepreneur (for all classes) divided by shares filed (including primary and secondary shares). The importance of this measure was first noted in Barry (1989), and Jain and Kini (1994) show that it significantly predicts long-term IPO performance.

PriorIR30: Average initial return of IPOs issued in the 30 days before the issue date. Ritter and Welch (2002) suggest that past initial returns predict long-term performance in some samples, but this result is driven by the late 1990s.

LogSize: Natural logarithm of the original filing amount. This variable is not known to predict long-term performance, and we include it as a control.

D Summary Statistics

[Insert Table I here]

Table I presents summary statistics for the 4,980 IPOs from 1984 to 2000. The table shows that average three-year returns are methodology dependent, and range from –9.6% for industry adjusted abnormal returns, to +8.4% for the Fama-French abnormal returns. These results confirm that, when the late 1990s are included, it is not clear whether or not IPOs underperform unconditionally, as discussed in Ritter and Welch (2002). Although unconditional performance is an interesting question, it is outside the scope of our study, as we focus on the role of industry conditions. Unlike the unconditional result, we will show that two industry conditions can predict long-term returns in cross section, and that their ability to do so is not methodology dependent. The table also shows that buy and hold abnormal returns experience greater volatility and skewness than cumulative abnormal returns. For example, style

matched buy and hold abnormal returns have nearly twice the standard deviation of style matched cumulative abnormal returns.

The table also shows that average first day returns (initial returns) in the sample are 20.9%, with a standard deviation of 45.3%. The average Carter Manaster rank of the lead underwriter is 7.2, and the average overhang is 2.9. These results roughly match those reported in other studies (see Bradley and Jordan (2002) for example). The table also displays summary statistics for the industry averages used in our study. The average HHI is 24.3% based on market capitalization, and 21.4% based on sales. Because the table's statistics are transaction weighted, the 20% standard deviation of both concentration measures shows that firms actively issue IPOs in both concentrated and non-concentrated industries. The average industry leverage is 21.7%, indicating that firms tend to go public in industries with relatively low leverage.[10]

[Insert Table II here]

Table II reports Pearson correlation coefficients. It shows that both measures of concentration, Size HHI and Sales HHI, are mutually correlated at 85.5%. Hence, it is not surprising that our results are robust to both methodologies for computing concentration. Although Sales HHI is more common in the industrial organization literature, Size HHI is more flexible because it can be computed on a monthly basis (due to data availability), and may be more relevant because it reflects a more forward looking view of an industry's competitive landscape. This follows because a firm's market capitalization is the discounted value of its future cashflows. In contrast, a firm's sales reflects its current state, and may have little meaning for growth industries. The table also shows that concentration correlates little with other industry variables, with the exception of IPO volume (45.3%). This is consistent with the result that industry concentration is a significant predictor of future IPO volume, which we report in section III.

Unlike concentration, industry leverage is more strongly correlated with other

[10]Reported summary statistics are transaction weighted. The average leverage of non IPO firms is nearly 30%, indicating that IPOs are indeed more likely in lower leverage industries.

variables: 61.1% with book to market, -49.9% with turnover, -36.8% with equity volatility, and 34.2% with profitability. Hence, we more carefully test our results concerning industry leverage to rule out multi-collinearity. As we demonstrate later in our study, industry leverage is a significant predictor of long-term returns, while the other industry characteristics generally are not. This result is robust to (1) four methodologies for computing long-term returns, and (2) regression specifications that examine robustness to multi-collinearity.

II Long-Term IPO Performance

Ritter (1991) and Loughran and Ritter (1995) document that IPO firms underperform in the long run relative to market-wide benchmarks. However, Eckbo and Norli (2001) and Ritter and Welch (2002) show that non-IPO firms with characteristics similar to IPO firms also perform poorly in the long-term. We do not take a position on whether IPOs unconditionally underperform in the long run. Instead, the goal of this section is to identify industry-specific factors that can explain long-term performance in cross section.

A Results

[Insert Table III here]

Table III presents the average three-year post-IPO abnormal return of IPOs grouped into quartiles based on various industry characteristics. Adopting methodologies from Barber and Lyon (1997), Fama (1998), Rau and Vermaelen (1998), and Schultz (2001), we consider four methodologies for computing abnormal returns: style-matched buy-and-hold abnormal returns, Fama-French three-factor abnormal returns, style-matched cumulative abnormal returns, and style-matched calendar-time abnormal returns. By considering a fifth measure, industry-matched buy-and-hold abnormal returns,[11] we are able to test whether IPO firms in each group perform

[11] We require firms to be public for at least one year before they are included in industry benchmark portfolios.

better or worse than existing public firms in their corresponding three-digit SIC industries.

Panels A and B of Table III display long-term performance versus ex-ante industry concentration for IPOs issued between 1984 and 2000. Panel A shows that IPOs issued in industries in the lowest concentration quartile (based on market capitalization) outperform those issued in the highest concentration quartile by 41.1% style-matched buy-and-hold abnormal returns, 49.7% style-matched cumulative abnormal returns, 36.6% Fama-French three-factor abnormal returns, and 32.8% style-matched calendar time abnormal returns. Moreover, the results are similar in magnitude regardless of whether the late 1990s (1998-2000) are included or excluded from the sample. Panel B shows that these return differentials, although somewhat smaller in magnitude, are also robust to using sales weighted HHI rather than size weighted HHI. All differences are significant at the 1% level. We conclude that IPOs in high concentration industries routinely underperform IPOs in less concentrated industries. Although not displayed, we can also report that the results are robust to using the 48 Fama-French industries rather than three digit SIC industries. Because size weighted HHI results are somewhat stronger, the table suggests that a more forward-looking view of industry concentration is most relevant.[12]

Unlike abnormal returns based on the other four asset pricing models, Table III shows that industry concentration does not sort *industry-matched* buy-and-hold abnormal returns. We conclude that existing public firms within concentrated industries perform just as poorly as the IPO firms themselves (conditional on the existence of recent IPO firms in the given industry).[13] The table also shows that industry concentration does not significantly sort issuer size or initial IPO returns. We conclude that the role of concentration cannot be explained by size effects.[14]

[12]Sales weighted concentration reflects current sales. Because a firm's market value is a weighted sum of its future cash flows, market capitalization based HHI can be viewed as a forward looking measure of concentration, reflecting expectations about future sales.

[13]It is important to note that the reported averages are equal-weighted over IPOs. Thus, we do not conclude that concentrated industries underperform in general. Rather, we only conclude that existing public firms residing in concentrated industries underperform when a positive number of IPOs are observed. This matter is explored further in section B.

[14]Several additional steps have been taken to assure readers that the concentration effect cannot be explained by size effects. We find that industry concentration is just as weakly correlated with average firm size within its industry, as it is with average IPO size. In Table IV, we confirm

Panels C and D of Table III show that differences in HHI are less relevant than HHI levels in predicting long-term performance. However, the results suggest (at the 5% to 10% level rather than the 1% level) that industries experiencing increasing competition (decreasing HHI) experience inferior long-term performance. One reason for the weaker difference results in Panels C and D relative to the levels in Panels A and B is that the competitive impact of observed IPO issuance may not become visible in differences, for months, or even years, after IPOs are completed. This result also suggests that the act of observing successful IPOs is more important than the size of the observed IPOs, consistent with the notion that the act of issuance (not the size of issuance) has information content, as discussed. This matter is discussed further in section D. For the remainder of this study, we restrict our attention to HHI levels.

Panel E of Table III shows that firms residing in high leverage industries underperform those in low leverage industries. In particular, IPOs in the highest industry leverage quartile experience abnormal returns that are 26% to 52% lower than IPOs residing in the lowest leverage quartile. As with the concentration effect reported in Panels A and B, the relationship between leverage and *industry-matched* buy-and-hold abnormal returns is not significant, so existing public firms within highly leveraged industries perform just as poorly as the IPO firms themselves (conditional on the existence of IPO firms).[15] Panel E also shows that there is a positive relationship between industry leverage and issuer size. However, later in this section we show that, even after controlling for issuer size, the ability of leverage to predict long-term abnormal performance remains robust. Unlike industry concentration, industry leverage shows some ability to sort initial returns, and highly leveraged industries generally experience IPOs with lower initial returns.

Panel F of Table III shows that industry-specific equity volatility also predicts long-term IPO performance. Firms in more volatile industries tend to outperform those in less volatile industries, and this result is robust to including or excluding the

that concentration, not industry-specific firm size, explains long-term IPO performance. Based on additional robustness checks (not reported), we also find that *underwriter* size does not matter.

[15]Similarly, we do *not* conclude that high leverage industries unconditionally underperform low leverage industries. Rather, they underperform conditional on the existence of IPOs in the given high leverage industry.

late 1990s. However, Panel F also shows that this result is weaker using calendar-time abnormal returns. Hence this result should be interpreted with caution, as the superior performance of firms in volatile industries may (in part) be driven by pseudo market timing, and the clustering of IPOs in hot markets. In contrast, the concentration and leverage effects reported in Panels A, B, and E are entirely robust to calendar time methods, and cannot be explained by pseudo market timing.

Panels G and H confirm the results documented in Carter, Dark, and Singh (1998) and Jain and Kini (1994), that IPOs underwritten by more prestigious underwriters, and IPOs issued by entrepreneurs who retain more shares, experience superior long-term performance. The panels also show that the Carter Manaster Rank is the most economically important predictor of long-term returns. However, industry concentration, industry leverage, and shares retained by the issuer are also economically large, with abnormal return differentials of roughly 30% to 40%. Both the "industry concentration effect', and the "industry leverage effect", are first documented in this study.

[Insert Table IV here]

Using simultaneous regression, Table IV formally verifies that the ability of industry concentration and industry leverage to explain long-term returns is truly novel, and cannot be explained by controls for other variables known to predict long-term returns. In order to avoid bias from pseudo market timing (as discussed in Schultz (2001)), we use the Fama-MacBeth regression method, which applies a weight of one to each year in our sample.[16] The dependent variable is the three-year post-IPO abnormal return of each IPO from 1984 to 2000. As in Tables III, we define long-term abnormal returns using four different asset pricing models, and the results are reported in Panels A to D. Because equity volatility, the leverage ratio, and the book-to-market ratio are highly correlated, we examine separate specifications for these variables.

Table IV also controls for the results of existing studies. For example, the table

[16]Hence, we do not overweight observations in IPO clusters. Not reported, results are similar but slightly stronger when we use OLS instead of the Fama-MacBeth method.

confirms the Carter, Dark, and Singh (1998) result that long-term IPO performance is positively related to the Carter-Manaster Rank. This result is economically large and robust (1) across all four asset pricing models and (2) across samples that include or exclude the late 1990s. Similarly, the positive and significant overhang coefficient reported in the table confirms the Jain and Kini (1994) result that issuers who retain more equity experience IPOs with superior long-term performance. Although not reported to conserve space, we also find that past IPO volume does not significantly predict long-term performance. This confirms Lowry (2003)'s result showing that past IPO volume, though it can predict raw long-term returns, cannot predict *abnormal* long-term returns. Also not reported, we find support for Ritter and Welch (2002)'s result showing that an IPO's initial return does not reliably predict its long-term abnormal performance.

Panels A, B and C of Table IV document (1) a significant negative relationship between industry concentration and long-term performance, (2) a significant negative relationship between industry leverage and long-term performance, and (3) a significant positive relationship between equity volatility and long-term performance. Panel D additionally establishes that (4) industry concentration and industry leverage do not significantly predict industry-adjusted abnormal returns. Thus, existing public firms in either concentrated or leveraged industries perform just as poorly (or just as well) as their corresponding IPO firms. In contrast, Panel D shows that equity volatility does significantly predict industry adjusted abnormal returns, and IPOs in more volatile industries outperform their industry peers. Hence, the abnormal performance attributed to industry volatility is unique to IPO firms in these industries. All results are robust to the inclusion of variables known to predict long-term performance, and are also robust to including or excluding the late 1990s from the sample.

B Non IPO Firms

Tables III and IV document that IPO firms and existing firms alike in concentrated industries, underperform relative to firms in less concentrated industries. This result

is economically large, and robust to several methods for computing abnormal returns. However, as discussed, we can only conclude that this result obtains conditional on observing a positive number of IPOs in a given industry. To fully understand the link between concentration, the existence of IPOs, and long term performance, it is thus useful to ask whether concentration can explain performance in industries that experience no IPOs at all. Table VI addresses this question. One observation is one three digit SIC code industry, and an industry is included in our sample in year t if it experienced zero IPOs in year t-1. Industries fitting this description are then separately grouped into terciles based on their December of year t-2 industry leverage and industry concentration (size HHI), and the table reports the long-term (three-year) performance of firms in industries in each grouping.

Table VI shows that non-IPO industries do not experience abnormal returns that vary significantly versus industry leverage or industry concentration groupings. The average returns, both along the diagonal, and off the diagonal, do not vary in a statistically significant, nor in an economically significant, fashion. We conclude that the reported abnormal performance of firms in high concentration industries is specific to industries that actually experience IPOs. We draw the same conclusion for the industry leverage effect. In section D, we discuss the importance of this result further.

C Examples

Table V displays three examples of the negative relationship between industry concentration and long-term abnormal returns. The miscellaneous plastics industry exemplifies the main idea. Prior to 1988, the industry was highly concentrated with just one existing public firm. Over the next decade, (1) firms continued to enter, (2) long term abnormal returns were sharply negative, and (3) the industry's concentration declined steadily. However, concentration finally leveled off at a more competitive level toward the end of the sample, and only then did long-term abnormal returns become somewhat positive. The women's clothing store industry experienced a concentration averaging 0.6 until the late 1990s. During this time,

the average abnormal three year post-IPO return was roughly -50%. By 1998, the industry's concentration declined to 0.5, and the 1998 IPO experienced abnormal three-year performance of +59%. The investment advice industry exhibits a similar pattern. The five IPOs issued in 1992 when concentration was 0.54, experienced abnormal performance averaging -16.4%. In contrast, the seven IPOs issued from 1995 to 1999, when the concentration was a more competitive 0.20, experienced abnormal performance of roughly +60%.

D Discussion

In this section, we established that IPOs in concentrated industries underperform relative to those in less concentrated industries. Moreover, the size of this underperformance is large, and post IPO abnormal returns generally exceed 35% over three years regardless of the asset pricing model used, and regardless of whether the late 1990s are included in the sample. In this section, we explore possible explanations, and discuss both risk based and behavioral theories.

Seminal theories including the capital asset pricing model and the arbitrage pricing theory suggest that differences in stock performance can arise from heterogeneous risk exposure. Although we cannot rule out risk, four items suggest that these explanations are less likely. (1) We find that abnormal returns persist in cross section even after controlling for known risk factors including market returns (MKT), size (SMB), and book to market risk (HML).[17] (2) We find that firms in highly concentrated industries with zero IPOs do not underperform. Hence, concentration-based underperformance is conditional on observing IPOs in a given industry, so industry concentration, in itself, is not a priced risk factor. The conditional nature of this result also suggests that exposure to these stocks is easy to diversify, making it less likely that they are associated with priced risk. (3) The magnitude of the observed underperformance may be too large to be explained by risk alone. IPOs in concentrated industries underperform by roughly 12% per year, an amount that is larger than even the average equity premium during this period. (4) Fama and

[17] Although not reported, we also find that momentum cannot explain the observed differences in abnormal returns.

French (1993) suggest that market returns (MKT), size (SMB), and book to market (HML) explain the majority of common "priced variance" in stock returns, leaving little room for an undiscovered risk factor pervasive enough to explain the observed return differentials.

We conclude that our results are a mystery given the current state of the asset pricing literature, and that the bar is placed high for admissible risk-based explanations. Regardless, the most plausible explanation based on risk is motivated by Gort and Klepper (1982), Jovanovic (1982), Klepper and Grady (1990), Klepper (1996), and Maksimovic and Phillips (2004) among others, who suggest that industries go through life cycles. In bad times, competitive industries are more likely to consolidate, and firms are more likely to become distressed. Hence, firms in competitive industries may be exposed to (systematic) macroeconomic risk, and firms in concentrated industries may be offsetting hedges. This explanation would predict that firms in concentrated industries will have lower expected returns than firms in competitive industries. However, this explanation has difficulty explaining why underperformance in concentrated industries is conditional on IPOs being issued. Also, this hypothesis cannot explain the link between industry concentration and IPO volume. This theory is also difficult to test because IPO data are only available from periods of relative economic growth.

Because the bar is placed high for risk based explanations, it is prudent to consider behavioral explanations, especially those that appeal due to their simplicity.[18] One explanation that both satisfies the simplicity requirement, and is consistent with all of the findings we report in our study, is the following: the observed decision to issue an IPO reveals information about future industrial organization, and investors overlook this information. The presence of information revelation, especially in concentrated industries, becomes clear in the context of the industrial organization literature.

It is well known among scholars of industrial organization that firms in concentrated industries face less competition from rivals, and typically enjoy relatively high profit margins. In practice, high profit margins can only persist in equilibrium when

[18]Simple explanations appeal to Occam's Razor: researchers should favor simple explanations in favor of more complicated ones.

rivals cannot enter due to (1) high costs of entry, (2) economies of scale, or (3) legal (i.e. patent) protection. Hence, high profit equilibria can be unstable in a dynamic economy, and observing successful entry should alert investors to the fact that the existing barriers to entry may be failing.[19] Because failing barriers to entry imply that future competition is likely to increase, investors should downwardly update their beliefs about future profits, and drive stock prices lower after observing entry. This price correction should be large, as successful entry by even a single firm likely implies that several additional firms may also rush to enter, greatly increasing competition in the coming months.

The logic of this explanation mirrors Myers and Majluf (1984), who show that observing a corporate finance decision (i.e. issuing equity) contains value-relevant information about a firm's growth options. In the case of industry concentration, a similar corporate financing decision (issuing an IPO) contains value-relevant information about an industry as a whole, not just a single firm. If investors ignore, or are not aware of, this industry-wide information content, the aforementioned downward price correction would occur later, when observed profit levels reflect the expected increase in competition. Here, it is easy to see why all of our study's key results arise when investors ignore this information content: (1) underperformance of IPOs in concentrated industries, (2) existing public firms in these same industries underperform by just as much as the IPO firms, (3) Concentrated industries experiencing zero IPOs do not underperform, (4) IPO volume is higher in concentrated industries (see section III), consistent with herding of entrants.

Given well-known facts regarding how today's investors value firms, it is easy understand why investors may indeed overlook the information content of IPOs. Arkebauer and Schultz (1991) and Purnanandam and Swaminathan (2004) suggest that underwriters and investors alike value firms using comparable firm ratios. The problem with this method is that ratios are based on current profit levels (primarily because this is all that is available). Hence, investors using ratios to value IPO firms in concentrated industries are assuming that they will enjoy the same high profit

[19]For example, technological innovation or changes in the legal environment can render patents to be irrelevant, lower the costs of entry, or destroy economies of scale.

margins of the past. This form of valuation error would later correct over time in the form of abnormal returns, as observed, when the effects of increased competition begin to appear in reported earnings.

In this section, we also documented that IPOs in highly leveraged industries underperform relative to IPOs issued in less leveraged industries. The same arguments presented for industry concentration also suggest that risk exposure alone likely cannot explain this result,[20] so behavioral explanations should be considered. Unlike industry concentration, however, several behavioral explanations may be at work. For example, this "leverage effect" may arise from the aforementioned "concentration effect", as valuation errors become magnified in leveraged industries because increased competition impacts entire firms, not just the portion financed by equity. The leverage effect might also be explained by a higher likelihood of predation. In particular, a highly leveraged entrant may be more sensitive to predation, so predation may occur more frequently. The act of predation is costly, so the IPO firm and existing firms alike, may underperform over the three year horizon that we examine in leveraged industries. Finally, high leverage may also proxy for fewer growth options. Here, underperformance may arise due to decreased investor enthusiasm for these less glamorous value industries.

III IPO Volume

Ibbotson and Jaffe (1975) document that IPO volume is highly correlated in time series. Lowry (2003) finds that capital demands and investor sentiment drive much of the variation in IPO volume. Because, as discussed, declining barriers to entry may predict the arrival of multiple entrants within concentrated industries, it is natural to ask whether industry concentration can predict future industry-specific IPO volume. This section explores this question.

[20] This result also only obtains conditional on observing IPOs, and existing public firms in highly leveraged industries perform just as poorly as these IPOs do.

A Results

[Insert Table VII here]

Table VII reports the results from Fama-MacBeth regressions[21] predicting industry-specific IPO volume. One observation is one industry in a calendar year, and the dependent variable is its number of IPOs in year t divided by its number of existing public firms at the end of year t-1. Each industry is defined by its three-digit SIC code.

Perhaps the most interesting result in Table VII is the stable, positive relationship between industry concentration and IPO volume. A one standard deviation (0.21) increase in an industry's concentration based on market capitalization (Size HHI), is associated with a roughly 0.7% increase in IPO volume.[22] This effect is statistically significant at the 1% level, and is robust to controls for variables known to predict IPO volume. It is also somewhat larger when we exclude the late 1990s. We conclude that IPO firms arrive more frequently in concentrated industries. The results are similar for industry concentration based on sales (not reported).

The table also confirms the results of existing studies, but on an industry-specific basis. For example, prior industry-specific IPO volume is an important predictor of future IPO volume, both statistically and economically. A one standard deviation (0.20) increase in prior industry-specific IPO volume results in a roughly 2.2% increase in future IPO volume. This finding suggests that IPO volume is not only autocorrelated market-wide, as documented by Ibbotson and Jaffe (1975), but it is also autocorrelated at the industry level. This result also supports Benninga, Helmantel, and Sarig (2003)'s theoretical prediction that IPOs tend to cluster within industries.

Similar to findings in Pagano, Panetta, and Zingales (1998) and Lowry (2003), we

[21] We use Fama-MacBeth regressions because we focus on cross-sectional analysis, not time-series analysis. Results are similar if we use a dynamic panel data treatment (not reported).

[22] We also include industry-year observations in which there is no IPO activity (and assign such observations an IPO volume of zero) to ensure that the results are not influenced by selection bias. Thus, unlike the correlation coefficients in Table II (which are based on industry-years in which IPOs actually occur), the data for Table VII includes annual observations for all industries.

also find a negative relationship between the industry book-to-market ratio and IPO volume. A one standard deviation (0.45) increase in the logarithm of the industry book-to-market ratio results in a 0.9% decrease in industry-specific IPO volume. Also confirming results in Lowry (2003), we find that prior industry returns are positively related to future IPO volume. The size of the average firm also matters, and is negatively related to IPO volume.

Ibbotson and Jaffe (1975) also show, perhaps surprisingly, that past initial returns do not predict IPO volume on a market-wide basis. However, we find that industry-specific past abnormal initial returns do predict IPO volume. The average R-squared from the Fama/MacBeth regressions in Table VII is roughly 11%, suggesting that much of the cross-sectional variation in industry-specific IPO volume is predictable.

B Discussion

The fact that higher concentration predicts higher IPO volume further supports the existence of information content associated with observing IPO issuance. In particular, this link between volume and industry concentration is predicted when investors ignore the information relevant to an industry's future organization, as discussed in section II. This section specifically supports the prediction that multiple entrants will arrive in concentrated industries when barriers to entry begin to erode.

IV Conclusion

We find that IPOs issued in more competitive, and more highly leveraged, industries underperform in the three years following their issuance. Both results are statistically significant at the 1% level, and are robust to four different asset pricing models for computing abnormal returns, to including or excluding the late 1990s, and to controls for variables known to predict the long-term performance of IPOs.

We also design tests to trace the economic sources of this underperformance. Although possible explanations are not mutually exclusive, and more than one may apply, our evidence most strongly supports a (behavioral) mispricing explanation

based on the information content of IPO issuance: observing the decision to issue an IPO reveals information about future industrial organization, and investors systematically overlook this information. The logic of this explanation mirrors Myers and Majluf (1984), who show that observing a corporate finance decision (i.e. issuing equity) contains value-relevant information about a firm's growth options. In the case of industry concentration, a similar corporate financing decision (issuing an IPO) contains value-relevant information about an industry as a whole, not just a single firm. In particular, observing an IPO indicates that long-standing barriers to entry may be failing, and additional multiple entrants may soon arrive, increasing competition and lowering profit margins in the near future.

If investors systematically overlook the information content of IPO issuance, the resulting long-term price correction can explain all of our study's key findings: (1) underperformance of IPOs in concentrated industries, (2) existing public firms in these same industries underperform by just as much as the IPO firms, (3) Concentrated industries experiencing zero IPOs do not underperform, and (4) IPO volume is higher in concentrated industries (consistent with herding of entrants). However, it is important to note that explanations for this "concentration effect" and "leverage effect" are not mutually exclusive. To this end, we believe that future researchers might do well to search for additional links between corporate financing decisions, information content, investor mispricing, and associated risk factors.

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Table I: Summary statistics

Explanation: Summary statistics are reported for IPOs issued in the US from 1984 to 2000 excluding: firms with an issue price less than five dollars, ADRs, financial firms, and REITs. **raw buy-and-hold return** is an IPO's actual buy and hold return for the three year period after its IPO. **style-matched buy-and-hold abnormal returns** are equal to an IPO's actual three-year raw return less the three-year return of a style-matched benchmark portfolio, where matching is based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios. **style-matched cumulative abnormal returns** are the abnormal monthly returns relative to the benchmark, accumulated over the 36 months following an IPO. **style-matched calendar time abnormal returns** are the average monthly abnormal returns (multiplied by 36 for convenience) using the same benchmark for four quartile portfolios that span each sample period. Each quartile portfolio has rotating membership and a given IPO enters its respective quartile portfolio in the month of its issuance and exits after its three-year anniversary. **Fama-French three-factor abnormal returns** are the intercept (multiplied by 36 for convenience) of Fama/French time series regressions, where each stock's excess returns are regressed on the market factor, the HML factor, and the SMB factor. **Industry-matched buy-and-hold abnormal returns** are equal to an IPO's actual three-year return less the equal-weighted average three-year return of all existing public firms in the given IPO's industry (based on three-digit SIC codes). **Initial Return** (IR), is the implied return from the IPO price to the after market trading price. **PastIR30** is the average underpricing for all IPOs issued in the 30 day window preceding the issue date. **CMrank** is the Carter-Manaster rank as listed in Carter, Dark and Singh (1998) and updated by Jay Ritter. **Overhang** is equal to the pre-IPO shares retained by the issuer divided by the shares filed, both primary and secondary. **LogSize** is the natural logarithm of the original filing amount. For an IPO issued in year t, average industry characteristics are equal-weighted averages of the given quantity over all existing public firms in the IPO's given three-digit SIC industry, over the twelve-month period from July, year t-2 to June, year t-1.

Variable	Description	Mean	Std. Dev.	Min-imum	Med-ian	Max-imum	Obser-vations
	Post IPO Three-Year Abnormal Returns						
Rawret	Raw 3-year buy and hold return	0.227	2.146	–0.999	–0.291	52.341	4,980
Styret (B+H)	Style matched buy and hold return	–0.001	2.170	–3.581	–0.458	52.098	4,980
Styret (Cum.)	Style matched cumulative return	–0.051	1.255	–4.750	0.018	9.848	4,980
FFalpha	Fama and French three factor return	0.084	1.411	–6.391	0.023	10.747	4,608
Indret	Industry matched buy and hold return	–0.096	2.076	–6.236	–0.458	51.645	4,980
	Price Variables						
IR	Initial returns	0.209	0.453	–0.404	0.071	6.975	4,980
PastIR30	Average IR 30 days before IPO	0.117	0.060	0.065	0.096	0.425	4,980
CMrank	Lead UW's Carter/Manaster rank	7.198	2.068	0.000	8.000	9.000	4,980
Overhang	Shares retained / shares filed	2.932	2.031	0.000	2.439	31.692	4,980
LogSize	Natural Logarithm of filing amount	18.504	1.190	15.071	18.458	24.572	4,980
	Average Characteristics of Existing Public Firms						
Size HHI	Herfindahl based on market cap	0.243	0.209	0.010	0.168	1.000	4,980
Sales HHI	Herfindahl based on sales	0.214	0.191	0.019	0.161	1.000	4,980
Leverage Ratio	Debt / debt plus market cap	0.217	0.127	0.000	0.189	0.842	4,980
Equity Volatility	Monthly return std deviation	0.166	0.049	0.029	0.165	1.393	4,980
Share Turnover	Share volume / shares outstanding	0.001	0.000	0.000	0.001	0.002	4,980
Profitability	Operating income / sales	0.117	0.063	0.000	0.103	0.752	4,980
Book/Market	Log of book to market ratio	–5.493	0.430	–9.130	–5.491	–3.551	4,980
Firm Size	Log of normalized market cap	5.842	1.180	–1.060	5.903	9.964	4,980
Prior Returns	One year stock return, t-1	0.055	0.290	–0.892	0.008	2.673	4,980
IPO Volume	# of IPOs / # of public firms in t-1	0.178	0.203	0.002	0.120	2	4,980

Table II: Correlation coefficients

Explanation: Pearson correlation coefficients are reported for IPOs issued in the US from 1984 to 2000 excluding: firms with an issue price less than five dollars, ADRs, financial firms, and REITs. IPOs issued from 1980 to 1983 are used to compute stable starting values for IndPastIR, and are otherwise excluded. For an IPO issued in year t, the average industry characteristics are equal-weighted averages of the given quantity over all existing public firms in the IPO's given three-digit SIC industry, over the twelve-month period from July, year t-2 to June, year t-1. **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization divided by the total market capitalization of all existing public firms within the given industry. **Sales HHI** is the Herfindahl index based on each firm's COMPUSTAT sales instead of its CRSP market capitalization. **Leverage ratio** is the book value of short-term and long-term debt divided by (market capitalization + book value of debt). A company's **equity volatility** is the standard deviation of its monthly returns. **Share turnover** is share volume divided by shares outstanding (winsorized at the 10% level). **Profitability** is the income to sales ratio, which is a firm's operating income divided by its sales (winsorized at the 10% level). **Book to market** is the log of book value of equity (Compustat item [60]) divided by December market capitalization. **Firm size** is the logarithm of (one plus the market capitalization of a given firm in millions of dollars scaled by S&P 500 level in the given year). **Prior return** is the equal-weighted industry-wide return in the prior year. **IPO volume** is the number of IPOs in a given year scaled by number of public firms at the end of the prior year.

Variable	Size HHI	Sale HHI	Leverage Ratio	Equity Volatility	Share Turnover	Profit-ability	Book to Market	Firm Size	Prior Returns
Sales HHI	0.853								
Leverage Ratio	0.280	0.336							
Equity Volatility	–0.124	–0.208	–0.368						
Share Turnover	–0.219	–0.295	–0.499	0.571					
Profitability	0.013	0.088	0.342	–0.195	–0.087				
Book to Market	0.212	0.239	0.611	–0.480	–0.560	0.086			
Firm Size	–0.209	–0.268	–0.146	0.065	0.373	0.164	–0.281		
Prior Return	0.010	–0.016	–0.053	0.139	0.153	0.094	–0.163	0.146	
IPO Volume	0.453	0.474	0.096	0.002	0.032	0.074	–0.068	–0.246	0.114

Table III: Long-term abnormal IPO returns by quartile

Explanation: Mean characteristics are reported for IPOs issued in the US from 1984 to 2000 (numbers in parentheses are for the sub-period that excludes 1998 to 2000) excluding: firms with an issue price less than five dollars, ADRs, financial firms, and REITs. IPOs issued from 1980 to 1983 are used to compute stable starting values for IndPastIR, and are otherwise excluded. Within each calendar year, IPOs are grouped into quartiles based on three variables: size-weighted HHI, sales-weighted HHI, changes in size-weighted HHI, and changes in sales-weighted HHI for Panels A to D respectively. The reported characteristics are equal-weighted averages over all observations within each quartile. **IR** is the implied return from the IPO price to the closing price after the firm's first day of public trading. We compute abnormal long-term returns using four popular methodologies, where an IPO's long-term returns are for the three years starting from the end of its first day of trading to its third anniversary. **style-matched buy-and-hold abnormal returns** are equal to an IPO's actual three-year raw return less the three-year return of a style-matched benchmark portfolio, where matching is based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios. **style-matched cumulative abnormal returns** are the abnormal monthly returns relative to the benchmark, accumulated over the 36 months following an IPO. **style-matched calendar time abnormal returns** are the average monthly abnormal returns (multiplied by 36 for convenience) using the same benchmark for four quartile portfolios that span each sample period. Each quartile portfolio has rotating membership and a given IPO enters its respective quartile portfolio in the month of its issuance and exits after its three-year anniversary. **Fama-French three-factor abnormal returns** are the intercept (multiplied by 36 for convenience) of Fama/French time series regressions, where each stock's excess returns are regressed on the market factor, the HML factor, and the SMB factor. **Industry-matched buy-and-hold abnormal returns** are equal to an IPO's actual three-year return less the equal-weighted average three-year return of all existing public firms in the given IPO's industry (based on three-digit SIC codes). **Issuer Size** is the original filing amount in millions. **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization divided by the total market capitalization of all existing public firms within the given industry. **Sales HHI** is the Herfindahl index based on each firm's COMPUSTAT sales instead of its CRSP market capitalization. Changes in HHI are over the 24 month period just prior to each IPO's sale date. At the bottom of each panel, significance levels for the difference between an item's average in the first quartile versus its average in the last quartile are reported in brackets for the entire sample and for the sample from 1984 to 1997. Significance levels denoted by ***, **, and * refer to the 1%, 5%, and 10% levels respectively.

	Characteristics for IPOs issued from 1984 to 2000 (1984 to 1997 in parentheses)							
Quartile	Initial Return (IR)	Syle-Matched Buy-and-hold Abnormal Return	Style-Matched Cumulative Abnormal Return	Fama-French Three Factor Abnormal Return	Style-Matched Calendar-Time Abnormal Return	Industry-Matched Buy-and-hold Abnormal Return	Issuer Size	Number of Observations
Panel A: Size HHI Quartiles								
Least Concentrated	21.1 (15.3)	26.2 (38.3)	20.5 (26.4)	27.1 (17.9)	16.5 (24.4)	–2.5 (5.1)	292.6 (168.6)	1193 (980)
Quartile 2	22.9 (11.2)	–4.9 (12.2)	–7.5 (6.2)	15.4 (–3.9)	–6.6 (18.1)	–16.0 (–7.2)	247.6 (175.0)	1280 (1009)
Quartile 3	21.6 (11.0)	–6.0 (6.0)	–12.1 (–1.7)	2.9 (–9.8)	–9.0 (–10.2)	–10.1 (–5.4)	320.7 (200.7)	1287 (994)
Most Concentrated	18.4 (10.8)	–14.9 (–5.8)	–19.2 (–8.0)	–9.5 (–22.1)	–16.3 (–16.5)	–11.7 (–5.4)	226.5 (158.9)	1233 (985)
Significance Level	[/***]	[***/***]	[***/***]	[***/***]	[***/***]	[/]	[/]	
Panel B: Sales HHI Quartiles								
Least Concentrated	28.1 (14.8)	15.6 (38.7)	8.3 (23.6)	33.3 (16.4)	13.2 (27.2)	–3.6 (9.2)	226.0 (149.5)	1310 (1003)
Quartile 2	18.5 (11.6)	6.4 (11.0)	2.7 (5.3)	8.3 (–5.8)	1.0 (11.9)	–9.3 (–6.0)	272.4 (174.3)	1183 (977)
Quartile 3	19.6 (11.7)	–12.4 (–1.2)	–12.3 (–1.5)	1.4 (–11.0)	–11.4 (–10.6)	–20.1 (–16.4)	274.0 (191.4)	1272 (1010)
Most Concentrated	17.6 (10.0)	–9.8 (2.7)	–18.2 (–5.0)	–8.8 (–18.2)	–17.3 (–13.2)	–7.2 (–0.6)	319.5 (191.9)	1250 (1000)
Significance Level	[***/***]	[***/***]	[***/***]	[***/***]	[***/***]	[/]	[***/**]	
Panel C: Two Year Changes in Size HHI Quartiles								
Declining Concentration	20.2 (11.7)	–15.1 (–3.7)	–10.2 (3.3)	2.3 (–7.7)	–13.3 (–10.3)	–20.5 (–16.2)	322.6 (169.3)	1216 (953)
Quartile 2	20.9 (14.0)	2.6 (13.9)	–6.2 (1.1)	4.1 (–7.7)	–9.2 (–6.0)	–7.7 (–1.2)	280.4 (177.2)	1243 (1001)
Quartile 3	24.0 (10.2)	0.9 (20.9)	–3.4 (11.2)	18.5 (0.1)	4.3 (15.9)	–11.7 (–1.9)	213.0 (164.0)	1277 (983)
Increasing Concentration	19.1 (12.3)	10.7 (19.3)	0.2 (7.5)	11.8 (–1.8)	2.1 (13.3)	–1.6 (4.9)	279.3 (195.2)	1226 (1001)
Significance Level	[/]	[***/**]	[**/]	[/]	[***/**]	[**/**]	[/]	
Panel D: Two Year Changes in Sales HHI Quartiles								
Declining Concentration	21.1 (12.0)	1.1 (12.5)	–6.6 (1.1)	3.8 (–8.6)	–5.5 (–2.1)	–6.0 (0.6)	283.7 (170.0)	1219 (975)
Quartile 2	14.7 (11.3)	–1.8 (2.1)	–2.1 (4.9)	2.3 (–5.7)	–7.1 (13.1)	–11.3 (–11.6)	283.6 (214.2)	1132 (986)
Quartile 3	27.9 (10.5)	–8.8 (11.0)	–8.8 (4.8)	20.7 (–5.5)	–2.1 (3.6)	–16.6 (–6.4)	260.8 (173.7)	1372 (1003)
Increasing Concentration	19.5 (14.7)	8.2 (23.8)	–2.3 (11.1)	7.7 (1.9)	–0.6 (9.2)	–8.3 (1.9)	270.6 (152.2)	1237 (973)
Significance Level	[/***]	[/]	[/*]	[/*]	[/*]	[/]	[/]	

Table III: Long-term abnormal IPO returns by quartile: Cont'd

Explanation: Mean characteristics are reported for IPOs issued in the US from 1984 to 2000 (numbers in parentheses are for the sub-period that excludes 1998 to 2000) excluding: firms with an issue price less than five dollars, ADRs, financial firms, and REITs. IPOs issued from 1980 to 1983 are used to compute stable starting values for IndPastIR, and are otherwise excluded. Within each calendar year, IPOs are grouped into quartiles based on three variables: industry leverage, equity volatility, Carter/Manaster rank, and Overhang for Panels A to D respectively. The reported characteristics are equal-weighted averages over all observations within each quartile. **IR** is the implied return from the IPO price to the closing price after the firm's first day of public trading. We compute abnormal long-term returns using four popular methodologies, where an IPO's long-term returns are for the three years starting from the end of its first day of trading to its third anniversary. **style-matched buy-and-hold abnormal returns** are equal to an IPO's actual three-year raw return less the three-year return of a style-matched benchmark portfolio, where matching is based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios. **style-matched cumulative abnormal returns** are the abnormal monthly returns relative to the benchmark, accumulated over the 36 months following an IPO. **style-matched calendar time abnormal returns** are the average monthly abnormal returns (multiplied by 36 for convenience) using the same benchmark for four quartile portfolios that span each sample period. Each quartile portfolio has rotating membership and a given IPO enters its respective quartile portfolio in the month of its issuance and exits after its three-year anniversary. **Fama-French three-factor abnormal returns** are the intercept (multiplied by 36 for convenience) of Fama/French time series regressions, where each stock's excess returns are regressed on the market factor, the HML factor, and the SMB factor. **Industry-matched buy-and-hold abnormal returns** are equal to an IPO's actual three-year return less the equal-weighted average three-year return of all existing public firms in the given IPO's industry (based on three-digit SIC codes). **Issuer Size** is the original filing amount in millions. **Industry leverage** is the book value of short-term and long-term debt divided by (market cap + book value of debt). A company's **equity volatility** is the standard deviation of its monthly returns in year t-1. **CMrank** is the lead underwriter's Carter-Manaster rank as listed in Carter, Dark and Singh (1998) and up. **Overhang** is equal to the pre-IPO shares retained by the issuer divided by the shares filed, both primary and secondary. At the bottom of each panel, significance levels for the difference between an item's average in the first quartile versus its average in the last quartile are reported in brackets for the entire sample and for the sample from 1984 to 1997. Significance levels denoted by ***, **, and * refer to the 1%, 5%, and 10% levels respectively.

Characteristics for IPOs issued from 1984 to 2000 (1984 to 1997 in parentheses)								
Quartile	Initial Return (IR)	Syle-Matched Buy-and-hold Abnormal Return	Style-Matched Cumulative Abnormal Return	Fama-French Three Factor Abnormal Return	Style-Matched Calendar-Time Abnormal Return	Industry-Matched Buy-and-hold Abnormal Return	Issuer Size	Number of Observations
Panel E: Leverage Quartiles								
Least Leveraged	28.7 (15.1)	14.6 (37.6)	10.0 (25.2)	40.2 (22.9)	13.4 (27.1)	–2.0 (11.1)	200.3 (148.4)	1287 (984)
Quartile 2	21.5 (12.8)	7.2 (12.5)	4.9 (8.0)	9.3 (–4.6)	0.3 (5.2)	–11.7 (–7.5)	207.1 (148.0)	1210 (1000)
Quartile 3	20.1 (11.2)	–9.9 (2.1)	–15.9 (–2.2)	–3.0 (–13.9)	–11.4 (4.4)	–13.3 (–6.3)	275.7 (195.3)	1266 (1009)
Most Leveraged	13.7 (9.0)	–11.6 (–0.3)	–18.2 (–8.1)	–12.1 (–22.8)	–16.3 (–16.5)	–13.1 (–9.2)	406.6 (215.2)	1252 (997)
Significance Level	[***/***]	[***/***]	[***/***]	[***/***]	[***/***]	[/*]	[***/***]	
Panel F: Equity Volatility Quartiles								
Least Volatile	15.2 (9.1)	–16.6 (–10.6)	–17.8 (–12.2)	–15.6 (–25.2)	–15.3 (–13.6)	–22.2 (–19.6)	400.6 (238.3)	1237 (992)
Quartile 2	21.9 (11.8)	–1.2 (12.4)	–7.9 (1.2)	7.2 (–10.5)	–6.9 (4.2)	–8.0 (–2.7)	309.6 (198.2)	1257 (989)
Quartile 3	19.7 (13.8)	14.4 (24.2)	7.8 (21.1)	18.2 (13.0)	1.4 (15.9)	–6.9 (–1.6)	191.5 (137.2)	1195 (1007)
Most Volatile	26.9 (13.4)	4.0 (25.1)	–1.2 (12.1)	25.1 (4.0)	6.3 (11.4)	–3.2 (11.5)	190.5 (134.6)	1328 (1004)
Significance Level	[***/***]	[**/***]	[***/***]	[***/***]	[*/**]	[**/***]	[***/***]	
Panel G: Carter-Manaster Rank Quartiles								
Least Prestigious	15.1 (12.5)	–28.0 (–20.8)	–26.4 (–18.1)	–12.2 (–21.1)	–24.5 (–22.4)	–32.7 (–31.4)	61.5 (41.4)	1180 (964)
Quartile 2	21.5 (10.3)	–9.2 (10.1)	–8.5 (3.6)	15.9 (–8.4)	–3.5 (3.3)	–16.4 (–3.6)	131.6 (73.1)	899 (635)
Quartile 3	27.0 (11.5)	4.5 (24.1)	–3.6 (14.8)	15.8 (2.8)	0.4 (14.4)	–6.8 (4.4)	347.9 (146.4)	1979 (1520)
Most Prestigious	15.2 (13.5)	30.8 (30.4)	19.1 (15.3)	11.0 (2.3)	15.6 (15.6)	17.0 (16.6)	482.5 (432.7)	1046 (945)
Significance Level	[/]	[***/***]	[***/***]	[***/***]	[***/***]	[***/***]	[***/***]	
Panel H: Overhang Quartiles								
Least Overhang	12.1 (9.1)	–16.3 (–6.2)	–18.7 (–9.2)	–7.9 (–15.0)	–11.1 (–6.7)	–18.4 (–13.6)	167.0 (112.7)	1273 (1015)
Quartile 2	17.6 (11.1)	–7.0 (5.6)	–6.8 (4.9)	3.7 (–9.3)	–7.4 (3.0)	–15.6 (–9.5)	160.0 (100.8)	1279 (1018)
Quartile 3	20.6 (11.5)	0.6 (13.1)	–3.6 (3.6)	7.6 (–8.0)	–6.3 (0.5)	–12.5 (–4.9)	235.8 (123.9)	1283 (1022)
Most Overhang	33.0 (16.1)	22.3 (38.3)	8.7 (22.0)	29.1 (12.9)	8.5 (21.9)	8.0 (17.7)	521.2 (368.6)	1275 (1015)
Significance Level	[***/***]	[***/***]	[***/***]	[***/***]	[*/***]	[***/***]	[***/***]	

Table IV: Fama/MacBeth style regressions predicting long-term abnormal IPO returns

Explanation: Fama/MacBeth style regression coefficients and T-statistics (in parentheses) are reported for IPOs issued in the US from 1984 to 2000 excluding: firms with an issue price less than five dollars, ADRs, financial firms, and REITs. The dependent variable is the three-year abnormal return after the IPO issue date. In Panel A, abnormal returns are computed using **style-matched buy-and-hold abnormal returns** (style matching is based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios) for 36 months. In Panel B, **style-matched cumulative abnormal returns** are monthly abnormal return cumulated over 36 months. In Panel C, **Fama-French three-factor abnormal returns** are the intercept (multiplied by 36 for convenience) of Fama/French time-series regressions, where each stock's excess returns are regressed on the market factor, the HML factor, and the SMB factor. In Panel D, **industry-matched abnormal returns** are actual returns less equal-weighted industry returns. For an IPO issued in year t, the average industry characteristics are equal-weighted averages of the given quantity over all existing public firms in the IPO's given three-digit SIC industry, over the twelve-month period from July, year t-2 to June, year t-1. **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization at the end of year t-1 divided by the total market capitalization of all existing public firms within the given industry. **Sales HHI** is the Herfindahl index based on each firm's COMPUSTAT sales instead of its CRSP market capitalization. **Equity volatility** is the equal-weighted industry average of the standard deviation of firm-level twelve monthly stock returns in year t-1. **Leverage ratio** is the book value of short-term and long-term debt divided by (market cap + book value of debt). **Book to market** is the logarithm of book value of equity (Compustat item [60]) divided by market capitalization. **Firm Size** is the log of (average firm market capitalization at the end of year t-1, in million dollars, in a given industry scaled by S&P 500 level). The **Carter/Manaster rank** is the average rank of the lead underwriter for all IPOs in the given industry in year t-1. **Overhang** is equal to the pre-IPO shares retained by the issuer divided by the shares filed, both primary and secondary. All post-IPO return and accounting variables are obtained from the CRSP and COMPUSTAT databases. **Log Issuer Size** is the natural logarithm of the original filing amount. **PastIR30** is the average underpricing for all IPOs issued in the 30 day window preceding each issue date.

Dependent variable = Long-term Abnormal returns, T-statistics in parentheses												
			Industry-wide Characteristics				*IPO Characteristics*					
Row	Time Period	Size HHI Level	Leverage Ratio	Equity Volatility	Log of Book-to-Market ratio	Firm Size	Carter/ Manaster Rank	Overhang	Log Issuer Size	PastIR30	R-Squared	Obser-vations
						Panel A: style-matched Buy-and-Hold Abnormal Returns						
(1)	All (1980-2000)	–0.295	–0.838			–0.012	0.128	0.084	–0.127	–2.576	0.062	4,955
		(–1.79)	(–2.06)			(–0.14)	(3.84)	(3.29)	(–1.87)	(–0.36)		
(2)	All (1980-2000)	–0.362		2.925		0.037	0.128	0.085	–0.138	–2.372	0.062	4,957
		(–2.15)		(2.51)		(0.43)	(4.04)	(3.16)	(–2.08)	(–0.31)		
(3)	All (1980-2000)	–0.382			–0.094	–0.028	0.131	0.090	–0.144	–2.886	0.061	4,956
		(–2.33)			(–0.86)	(–0.31)	(4.14)	(3.33)	(–2.09)	(–0.36)		
(4)	1980-1997	–0.452	–0.853			–0.040	0.141	0.092	–0.153	–2.399	0.061	3,934
		(–2.71)	(–1.82)			(–0.37)	(3.81)	(3.26)	(–1.91)	(–0.27)		
(5)	1980-1997	–0.475		3.620		0.023	0.140	0.091	–0.158	–2.126	0.060	3,936
		(–2.52)		(2.88)		(0.23)	(3.97)	(3.02)	(–1.98)	(–0.23)		
(6)	1980-1997	–0.516			–0.099	–0.059	0.143	0.097	–0.167	–2.714	0.060	3,936
		(–2.93)			(–0.80)	(–0.54)	(4.11)	(3.27)	(–2.04)	(–0.28)		
						Panel B: style-matched Cumulative Abnormal Returns						
(7)	All (1980-2000)	–0.248	–0.870			0.038	0.081	0.042	–0.068	–4.806	0.075	4,955
		(–2.73)	(–2.84)			(0.58)	(3.47)	(2.73)	(–1.85)	(–1.27)		
(8)	All (1980-2000)	–0.333		2.318		0.066	0.081	0.046	–0.081	–4.191	0.072	4,957
		(–3.21)		(2.31)		(1.09)	(3.76)	(2.86)	(–2.21)	(–1.07)		
(9)	All (1980-2000)	–0.347			–0.170	0.009	0.082	0.046	–0.080	–4.870	0.075	4,956
		(–3.68)			(–1.62)	(0.14)	(3.72)	(2.89)	(–2.11)	(–1.17)		
(10)	1980-1997	–0.318	–0.798			0.011	0.078	0.043	–0.062	–5.239	0.073	3,934
		(–3.24)	(–2.33)			(0.16)	(2.94)	(2.96)	(–1.40)	(–1.14)		
(11)	1980-1997	–0.350		2.631		0.050	0.077	0.045	–0.067	–4.436	0.070	3,936
		(–2.87)		(2.73)		(0.79)	(3.13)	(2.79)	(–1.52)	(–0.93)		
(12)	1980-1997	–0.372			–0.166	–0.016	0.078	0.044	–0.067	–5.221	0.073	3,936
		(–3.37)			(–1.55)	(–0.22)	(3.11)	(3.08)	(–1.48)	(–1.03)		

Table IV: Fama/MacBeth style regressions predicting long-term abnormal IPO returns: Cont'd

Explanation: Fama/MacBeth style regression coefficients and T-statistics (in parentheses) are reported for IPOs issued in the US from 1984 to 2000 excluding: firms with an issue price less than five dollars, ADRs, financial firms, and REITs. The dependent variable is the three-year abnormal return after the IPO issue date. In Panel A, abnormal returns are computed using **style-matched buy-and-hold abnormal returns** (style matching is based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios) for 36 months. In Panel B, **style-matched cumulative abnormal returns** are monthly abnormal return cumulated over 36 months. In Panel C, **Fama-French three-factor abnormal returns** are the intercept (multiplied by 36 for convenience) of Fama/French time-series regressions, where each stock's excess returns are regressed on the market factor, the HML factor, and the SMB factor. In Panel D, **industry-matched abnormal returns** are actual returns less equal-weighted industry returns. For an IPO issued in year t, the average industry characteristics are equal-weighted averages of the given quantity over all existing public firms in the IPO's given three-digit SIC industry, over the twelve-month period from July, year t-2 to June, year t-1. **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization at the end of year t-1 divided by the total market capitalization of all existing public firms within the given industry. **Sales HHI** is the Herfindahl index based on each firm's COMPUSTAT sales instead of its CRSP market capitalization. **Equity volatility** is the equal-weighted industry average of the standard deviation of firm-level twelve monthly stock returns in year t-1. **Leverage ratio** is the book value of short-term and long-term debt divided by (market cap + book value of debt). **Book to market** is the logarithm of book value of equity (Compustat item [60]) divided by market capitalization. **Firm Size** is the log of (average firm market capitalization at the end of year t-1, in million dollars, in a given industry scaled by S&P 500 level). The **Carter/Manaster rank** is the average rank of the lead underwriter for all IPOs in the given industry in year t-1. **Overhang** is equal to the pre-IPO shares retained by the issuer divided by the shares filed, both primary and secondary. All post-IPO return and accounting variables are obtained from the CRSP and COMPUSTAT databases. **Log Issuer Size** is the natural logarithm of the original filing amount. **PastIR30** is the average underpricing for all IPOs issued in the 30 day window preceding each issue date.

Dependent variable = Long-term Abnormal returns, T-statistics in parentheses												
			Industry-wide Characteristics				*IPO Characteristics*					
Row	Time Period	Size HHI Level	Leverage Ratio	Equity Volatility	Log of Book-to-Market ratio	Firm Size	Carter/ Manaster Rank	Overhang	Log Issuer Size	PastIR30	R-Squared	Obser-vations
						Panel C: fama-french three-factor Abnormal Returns						
(13)	All (1980-2000)	–0.227	–1.190			0.062	0.082	0.060	–0.110	–2.628	0.071	4,402
		(–1.98)	(–4.14)			(0.79)	(5.05)	(3.94)	(–2.69)	(–0.89)		
(14)	All (1980-2000)	–0.345		3.033		0.092	0.083	0.063	–0.124	–2.261	0.065	4,404
		(–2.54)		(3.84)		(1.29)	(5.27)	(3.92)	(–2.99)	(–0.79)		
(15)	All (1980-2000)	–0.342			–0.284	0.015	0.082	0.063	–0.121	–2.598	0.068	4,403
		(–2.62)			(–3.02)	(0.22)	(5.36)	(4.00)	(–2.80)	(–0.87)		
(16)	1980-1997	–0.285	–1.005			–0.031	0.071	0.048	–0.068	–2.901	0.067	3,590
		(–2.61)	(–3.45)			(–0.45)	(4.30)	(3.13)	(–1.65)	(–0.81)		
(17)	1980-1997	–0.359		2.501		0.015	0.071	0.051	–0.078	–2.268	0.060	3,592
		(–2.77)		(3.77)		(0.23)	(4.62)	(3.07)	(–1.96)	(–0.65)		
(18)	1980-1997	–0.348			–0.235	–0.048	0.071	0.048	–0.071	–2.701	0.064	3,592
		(–2.71)			(–2.87)	(–0.72)	(4.65)	(3.22)	(–1.75)	(–0.75)		
						Panel D: Industry-adjusted Abnormal Returns						
(19)	All (1980-2000)	–0.051	0.095	0.069	–0.076	–0.049	0.051	4,955				
		(0.28)	(–1.69)			(–0.61)	(3.03)	(2.99)	(–1.10)	(–0.01)		
(20)	All (1980-2000)	0.007		2.562		0.010	0.095	0.065	–0.079	–0.395	0.055	4,957
		(0.05)		(2.10)		(0.14)	(3.05)	(2.82)	(–1.17)	(–0.08)		
(21)	All (1980-2000)	0.004			–0.061	–0.045	0.098	0.069	–0.082	–0.633	0.051	4,956
		(0.03)			(–0.73)	(–0.55)	(3.08)	(2.92)	(–1.16)	(–0.12)		
(22)	1980-1997	–0.035	–0.454			–0.119	0.105	0.075	–0.081	0.552	0.052	3,934
		(–0.22)	(–1.70)			(–1.31)	(2.90)	(2.92)	(–0.96)	(0.09)		
(23)	1980-1997	–0.055		3.503		–0.043	0.104	0.069	–0.080	0.091	0.055	3,936
		(–0.33)		(2.59)		(–0.51)	(2.90)	(2.68)	(–0.97)	(0.01)		
(24)	1980-1997	–0.087			–0.065	–0.114	0.108	0.075	–0.087	–0.145	0.052	3,936
		(–0.54)			(–0.65)	(–1.29)	(2.97)	(2.84)	(–1.02)	(–0.02)		

Table V: Examples of long-term performance versus industry concentration from 1986 to 1999

Explanation: The table displays yearly **style-matched buy-and-hold abnormal returns** for three industries from 1986 to 1999. Style matching is based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios. For each industry, the table also displays the number of IPOs completed in the given year, along with the Size HHI prevailing in the previous year. **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization at the end of year t-1 divided by the total market capitalization of all existing public firms within the given industry.

	Miscellaneous Plastics Products			Women's Clothing Stores			Investment Advice		
year	Prior HHI	# of IPOs	Buy-and-hold AR	Prior HHI	# of IPOs	Buy-and-hold AR	Prior HHI	# of IPOs	Buy-and-hold AR
1986				0.586	4	-59.8%			
1987				0.662	2	-46.2%			
1988	1.000	1	-133.1%						
1989									
1990									
1991	0.736	1	-48.5%	0.588	1	-46.4%			
1992	0.732	1	16.9%				0.544	5	-16.4%
1993	0.705	4	-30.4%	0.696	4	-24.9%			
1994	0.544	1	-97.4%						
1995	0.424	1	-82.1%				0.254	2	144.2%
1996	0.345	1	-68.5%	0.625	1	-68.4%			
1997	0.338	1	-62.7%				0.146	2	-37.6%
1998	0.247	2	-42.6%	0.493	1	58.9%			
1999	0.169	1	35.2%				0.196	3	87.7%
2000	0.140	1	20.7%						

Table VI: Long-term Performance of Non-IPO industries versus industry concentration and industry leverage

Explanation: The table displays the average abnormal performance of non-IPO industries versus industry concentration and industry leverage. Initially, one observation is one three digit SIC code industry, and an industry is included in our sample in year t if it experienced zero IPOs in year t-1. Industries fitting this description are then separately grouped into terciles based on their December of year t-2 levels of industry leverage and industry concentration (size HHI). **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization at the end of year t-1 divided by the total market capitalization of all existing public firms within the given industry. An industry's **Leverage ratio** is the book value of short-term and long-term debt divided by (market cap + book value of debt), averaged over firms in the given industry. For industries falling into each of the nine tercile groupings, we then compute their average abnormal three year returns using three methods. **style-matched buy-and-hold abnormal returns** are based on 10 size and 5 book to market portfolios with NYSE breakpoints = 50 benchmark portfolios. **style-matched cumulative abnormal returns** are monthly abnormal returns cumulated over the 36 months in each period. In Panel C, **Fama-French three-factor abnormal returns** are the intercept (multiplied by 36 for convenience) of Fama/French time-series regressions, where each stock's excess returns are regressed on the market factor, the HML factor, and the SMB factor.

Size HHI Grouping	Least Leveraged Tercile	Middle Leveraged Tercile	Most Leveraged Tercile
Panel A: style-matched Buy-and-Hold Abnormal Returns			
Least Concentrated	–1.4	–6.7	-1.3
Middle Tercile	–9.6	–7.0	–3.5
Most Concentrated	–4.4	–10.0	–5.5
Panel B: style-matched Cumulative Abnormal Returns			
Least Concentrated	5.6	–1.0	–2.1
Middle Tercile	–1.0	–3.3	–3.2
Most Concentrated	8.6	–6.9	6.3
Panel C: fama-french three-factor Abnormal Returns			
Least Concentrated	7.3	–1.3	3.2
Middle Tercile	6.8	6.9	–3.5
Most Concentrated	14.4	3.7	3.7

Table VII: Fama/MacBeth style regressions predicting IPO volume

Explanation: Fama/MacBeth regression coefficients and T-statistics (in parentheses) are reported. One observation represents a three-digit SIC code in one year. The dependent variable is the IPO volume in an industry in year t. It is measured as the number of IPOs in year t scaled by the number of public firms in the industry at the end of prior year. **Prior Volume** is the past year's IPO volume within the given industry (i.e., from year t-1). The independent variables measuring industry characteristics are equal-weighted averages of the given quantity over all existing public firms in the three-digit SIC industry, over the twelve-month period from July, year t-2 to June, year t-1. **Size HHI** is the industry's concentration, computed as the Herfindahl index (sum of squared market shares of existing public firms), where each firm's market share is its CRSP market capitalization divided by the total market capitalization of all existing public firms within the given industry at the end of year t-1. **Sales HHI** is the Herfindahl index based on each firm's COMPUSTAT sales instead of its CRSP market capitalization. **Leverage ratio** is the book value of short-term and long-term debt divided by (market cap + book value of debt). **Equity volatility** is the standard deviation of monthly stock returns for all existing public firms in the given three-digit SIC code. **Firm Size** is the log of (average firm market capitalization at the end of year t-1, in million dollars, in a given industry scaled by S&P 500 level). **Book to market** is the log of book value of equity (Compustat item [60]) divided by market capitalization at the end of the fiscal year. **Prior return** is the equal-weighted industry-wide return in year t-1. **IndPastIR**$_{t-2}$ is the average abnormal initial return for all IPOs issued in the given industry from 1984 to year t-2. Abnormal initial returns are actual initial returns less market-wide average initial returns in the same month.

Dependent variable = IPO volume in an industry, T-statistics in parentheses

Row	Sample Period	Size HHI	Prior Volume	Leverage Ratio	Equity Volatility	Book to Market	Firm Size	Prior Return	IndPastIR$_{t-2}$	R-Squared	Number of Observations
(1)	All (1980-2000)	0.032	0.120	0.013			-0.014	0.026	0.083	0.098	4,177
		(3.33)	(3.34)	(0.46)			(-3.71)	(2.24)	(3.16)		
(2)	All (1980-2000)	0.031	0.119		0.021		-0.014	0.029	0.082	0.096	4,178
		(3.33)	(3.80)		(0.35)		(-3.04)	(2.55)	(2.71)		
(3)	All (1980-2000)	0.030	0.111			-0.022	-0.015	0.023	0.061	0.101	4,170
		(2.95)	(3.18)			(-3.21)	(-3.62)	(2.03)	(2.08)		
(4)	1980-1997	0.040	0.114	0.011			-0.016	0.027	0.087	0.098	3,237
		(4.08)	(2.71)	(0.33)			(-3.86)	(1.97)	(2.89)		
(5)	1980-1997	0.040	0.116		-0.013		-0.017	0.030	0.090	0.095	3,238
		(4.05)	(3.16)		(-0.19)		(-3.35)	(2.33)	(2.53)		
(6)	1980-1997	0.040	0.103			-0.023	-0.018	0.022	0.065	0.102	3,232
		(3.81)	(2.53)			(-2.82)	(-3.69)	(1.68)	(1.83)		