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Informational Externalities of Going Public Decisions: Evidence from Industrial Sector

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Informational Externalities of Going Public Decisions: Evidence from Industrial Sector

Abstract

Theoretical models predict that going public firms generate positive externalities, creating a spillover effect for other firms to go public. In this paper, we posit that venture backed IPOs convey positive informational externalities for the publicly traded rival firms in the same industry and test three related hypotheses. The hypotheses are: 1) Venture backed IPOs convey positive information about industry and this information is transferred to rival firms; 2) Intra-industry information transfer varies with rivals' characteristics; 3) IPO price revisions generate additional information that affects rivals' valuation. The results show that rivals have positive valuation effects only in response to venture backed IPOs and no significant reaction in response to non-venture backed IPOs. We also find evidence that the effect on rival firms is stronger if they operate in low concentrated industries (i.e. high competition) and have low growth opportunities. The relative size of IPO firm seems to play an important role in the direction and magnitude of industry rivals' valuation effects. Negative information revealed in the form of downward price revisions adversely affect rival firms' valuation.

Introduction

Prior studies document positive informational externality effects of IPOs on potential issuers related by a common valuation factor (Subramanyam and Titman, 1999; Benveniste, Busaba and Wilhelm, 2002). The information revealed at the time firms file their prospectus with the SEC as well as the additional information revealed during bookbuilding phase, has a significant impact on potential issuers that operate in the same industry. Potential issuers condition their decision to become publicly traded companies depending upon the outcome of their contemporaries (the probability of withdrawal, price revisions, underpricing). Benveniste, Ljungqvist, Wilhelm and Yu (2003) show that firms attempt to go public when positive information spills over from previous IPOs (i.e. lower underpricing).

If initial public offering announcements reveal valuable information for potential issuers related by a common valuation factor, it is likely that investors in similar publicly traded firms use this information to reassess the value of their own firms' future prospects. Therefore, initial public offering announcements are likely to have externality effects for rival firms within the same industry.

In this study we expand the current research by examining the informational externalities of going public decisions by industrial firms on existing publicly traded firms within the same industry (rivals).

This study is guided by two primary motives: 1) To investigate which of two potential externalities of IPOs—competitive and contagion—is more powerful, and 2) To examine if differential externalities exist depending on whether or not an IPO is venture-backed. The first motive for examining this issue stems from the fact that two opposing theories on externalities predict conflicting results regarding the effect of an IPO on rival firms. An IPO, on one hand

might signal a change in industry's outlook (i.e. future growth opportunities) and therefore, bring about positive valuation effects for rival firms. On the other hand, the decision to go public might cause a reassessment of the competitive situation within the industry. Since the IPO firm raises equity funds that can be used to expand in the product market and compete more efficiently, rival firms may lose some of their market share. Therefore, this possibility predicts negative valuation effects for rival firms.

Empirical evidence suggests that venture-backed IPOs convey superior information to IPOs that are not venture-backed. Empirical findings include: 1) Venture capitalists firms have access to top tier investment bankers (Megginson and Weiss, 1991); 2) Venture capitalists are successful in timing the decision to take the companies public (Lerner, 1994); 3) Brav and Gompers (1997) and Ivanov (2004) show that, venture backed IPO firms perform better than non-venture backed IPO firms. Lee and Wahal (2003) show that the difference in underpricing between venture backed and non-venture backed IPOs (6.2%-9.5%) represent a wealth transfer from venture capitalists to new shareholders. As a compensating benefit associated with incremental underpricing of venture backed IPOs, they document a positive relationship between the level of underpricing and future inflows of capital to venture capital firms. Overall, the recent empirical findings suggest that venture backed IPOs signal superior information to the market relative to non-venture backed IPOs.

Only a limited amount of work exists regarding the impact of IPO announcements on rival firms within the same industry. Slovin, Sushka and Ferarro (1995) find that rivals react negatively to equity carve-out (non-traditional IPO) announcements. They interpret this result as unfavorable information about industry prospects conveyed by equity carve-outs to industry rivals. They further show comparable effects on rivals by firms that undertake traditional IPOs

(107 firms). However, they do not examine the event specific characteristics and industry characteristics that might explain the diverse rivals' reaction across industries.

Melvin and Valero-Tonone (2003) examine the impact of firms' U.S. cross-listing on home-market rival firms. Since foreign firms list their shares for the first time in U.S. and typically the listing is accompanied by raising equity, they can be viewed as IPOs with potential information effects transferred to home-rival firms. The results show that rivals are hurt by the listing of other firms in their industry, suggesting that U.S. listed firms enhance the ability to take advantage of growth opportunities.

Akhigbe, Borde and Whyte [ABW] (2003) examine whether an industry effect exists for initial public offerings. Their results show that IPO announcements are firm specific events, with no information transferred to industry counterparts. They interpret this result as offsetting information and competitive effects. However, caution needs to be exercised when interpreting the results reported by ABW. First, these authors do not separate the impact of venture capital backed from non-venture backed IPOs. Second, the authors pool all the IPOs in the sample without considering the difference in information structure between industrial and non-industrial firms.[1] Finally, ABW do not control for confounding events pertaining to rival firms around IPO announcements that could potentially contaminate the rivals' stock price reaction to these announcements.

[1] There are two reasons why this analysis should be partitioned on industrial firms and non-industrial firms. First, Diamond (1984, 1991) and Ramakrishnan and Thakor (1984) show that information structure of banking firms is different than that of industrial firms; hence, a bank public announcement might generate external information effects on other banks to an extend not found in industrial sector (Slovin, Sushka and Polonchek, 1992). A bank decision to go public might not be entirely a voluntary action as it is for unregulated, industrial firms, but it reflects private information held by managers and regulators about bank's capital and the value of its loan portfolio. Second, the regulatory environment for utility and banking industries creates less diversity across firms. Kohers (1999) shows that intra-industry information transfer is more pronounced in homogeneous industries, because investors have higher propensity to draw inferences from public corporate events.

In this study, the major hypothesis is that going public firms generate significant informational externalities on rival firms in the same industry around IPO announcements. On average, the results show that there is a positive valuation effect for rivals, which seems to indicate that going public decisions signal positive industry prospects (i.e. future growth opportunities). However, when the sample is partitioned into venture backed IPOs and non-venture backed IPOs, rivals have positive valuation effects only in response to venture backed IPOs and no significant reaction in response to non-venture backed IPOs. We also find evidence that the effect on rival firms is stronger if they operate in less concentrated industries (i.e. many competitors) and have low growth opportunities. The relative size of the IPO firm seems to play an important role in the direction and magnitude of industry rivals' valuation effects. Rivals experience larger wealth gains in response to a relatively larger entrant within the same industry. Negative information revealed at the offering date in the form of downward price revisions has a negative impact on rivals' valuation. In spite of a downward price revision, an IPO firm may not withdraw the offer probably because it wants to expand early in the product market, posing a threat to rival firms.

This paper is organized as following: section 1 develops the hypotheses; section 2 discusses the sample and methodology. We report the results in section 3 and section 4 concludes.

1. Hypotheses

1.1. Intra-industry information transfer around IPO announcements

Previous literature has shown that various firm-level announcements have implications for rival firms. If the information disclosed has industry-wide implications, then rival firms experience contagion effects (the direction of rivals' abnormal returns is the same as that of the announcing firm). If the information revealed has competitive implications, rival firms' abnormal returns have opposite direction than that of the announcing firms. Finally, information pertaining to some corporate events is firm specific; therefore, there is no spillover or competitive effect on rival firms.

If the information disclosed by IPO firms at the time they file with SEC has externality effects as suggested by theoretical studies, then investors in similar companies use this information to evaluate the value of their own firms' future prospects. Therefore, IPO announcements are likely to affect stock prices of rival firms, thus having an industry-wide implication. To test whether information conveyed by IPO announcements has an impact on the equity value of rivals, we hypothesize that:

H1: An IPO announcement has a significant valuation impact on rival firms.

The rivals' reaction to IPO announcements can be either positive or negative depending on how investors use the information revealed to make inferences about non-announcing firms' future prospects. However, the positive and negative reactions are not mutually exclusive. Thus, the rivals' reaction to IPO announcements is the sum of these two opposing effects. Either a significant positive or negative net effect indicates that IPO announcements reveal information that has industry-wide implications.

1.1.1. The positive reaction prediction

According to market timing hypothesis, firms have the propensity to go public when industry market-to-book ratios are especially high (Lerner, 1994). Also, Lowry (2002) shows that high IPO volume occurs when private's firm demand for capital is high, adverse selection cost of equity is low and investors are overoptimistic. If going public decision signals positive industry prospects (i.e., future growth opportunities), the average market to book value of the already publicly held firms should increase. Thus, it is possible that going public decisions may potentially have positive externalities on market valuation of similar public firms.

1.1.2.. The negative reaction prediction

Macsimovic and Pichler (2001) explore a setting in which the going public decision conveys valuable information to competitors in the product market. By raising capital in the IPO to expand a new technology, firms may convey strategic comparative advantages within industry, and therefore, competitors face the probability of being displaced by a more technologically advanced rival. This implies that rival firms should react negatively at the time of the IPO announcements. An even clearer negative reaction prediction stems from the signaling product quality at the time of IPO (Stoughton, Wong, and Zechner, 2001). By offering to sell stock in their firm, entrepreneurs are stating that they believe the firm has high quality products. When an IPO is announced and a prospectus is released, sensitive information regarding the firm and its industry is published. As the stock price rises, favorable publicity surrounding the firm improves consumers' perception of the quality of the firm's products. As consumers increase their product purchases, the stock price responds favorably, increasing the profits of the firm.

The stock prices of competitors can fall when a new IPO is announced if new information conveys more positive prospects for the issuing firm than for the growth of the industry.

1.2. Venture backed IPOs vs. non venture backed IPOs

Venture capital firms specialize in collecting and evaluating information of start-up and growth companies, which are more likely to be prone to information asymmetries and capital constraints. Because venture capitalists firms have access to top tier investment bankers (Megginson and Weiss, 1991), venture capital firms may partially overcome the information asymmetry associated with start-up and growth companies and thus, a venture capital backed firm will be less dependent on its internally generated funds. Also, venture capitalists are successful in timing the decision to take the companies public (Lerner, 1994). A venture-backed company goes public when its valuation is at the absolute, short-run peak and when the industry valuations are highest. By successfully timing the IPO, venture capitalists derive significant benefits, even though they rarely sell shares at the time of the offering. Taking companies when equity values are high minimizes the dilution of the venture investor's ownership stake. Brav and Gompers (1997) show that, venture backed IPO firms perform better than non-venture backed IPO firms, and the market incorporates these expectations at the time of going public. Therefore, a venture backed IPO signals superior information to the market than a non-venture backed IPO. Ivanov (2004) shows that venture backed IPOs have significant higher underpricing than non-venture backed IPOs and the valuations do not change much in the long run (five years after IPO). Consistent with Brav and Gomper's (1997) findings, venture backed IPOs perform better in the long run than non-venture backed IPOs. Also, a significant portion of venture capitalists consists of corporate venture capitalists that have valuable industry expertise. When they bring

companies public, the certification role played by venture capitalist may explain why investors are willing to pay more for venture backed IPOs. However, this higher underpricing represent a real cost for venture capitalists, since they rarely sell shares in the IPO. Lee and Wahal (2003) show that the difference in underpricing between venture backed and non-venture backed IPOs (6.2%-9.5%) represent a wealth transfer from venture capitalists to new shareholders. As a compensating benefit associated with incremental underpricing of venture backed IPOs, they document a positive relationship between the level of underpricing and future inflows of capital to venture capital firms. Thus, the "grandstanding" behavior documented by Gompers (1996) explains the costs that venture capitalists are willing to bear in taking their portfolio companies public. Overall, the recent empirical findings suggest that venture backed IPOs signal superior information to the market relative to non-venture backed IPOs.

One important prediction derived from signaling and timing ability of venture capital firms at the time they go public is that industry rivals will react differently to IPO announcements, depending on whether the IPO is venture backed or not. Therefore, we hypothesize that:

H2: A venture backed IPO, compared to a non-venture backed IPO has higher valuation effect on rival firms.

1.3. Relative size of IPO firm

The bigger the size of the IPO firm relative to the industry, the more information an IPO is expected to convey. Therefore, the larger the relative size of IPO firm, the greater the impact on industry rivals' reactions. To examine whether the relative size of IPO firm has a differential impact on stock price responses of industry rivals, we compute the relative size of IPO as the

ratio of IPO firm's total assets to industry rivals' total assets within the same four-digit SIC code. This measure is more appropriate than IPO proceeds, since the size of IPO is related to the size of industry rivals. To test whether the relative size of IPO firm has a differential impact on industry rivals, we hypothesize that:

H3: The larger the relative size of IPO firm, the greater the valuation impact on the rivals.

1.4. Intra-industry reaction and rivals' specific characteristics

The impact of IPO announcements is not expected to be the same for all firms in the same industry. Rather, the differences in firm characteristics (for example, rival's size, its ability to take advantage of the future growth potential, and whether it belongs to a concentrated industry, etc) will dictate the direction and magnitude of rivals' reaction in response to IPO announcements.

Rival firm size:

Atiase (1985) argues that information production and dissemination are positive function of firm size. Thus, the expected change in valuation induced by public announcements should be inversely related to firm size. Atiase reports evidence consistent with this argument in that there is a larger share price reaction to earnings announcements for small firms relative to that of large firms. Also, Slovin, Sushka and Bendek (1991) find that industry rivals' excess returns generated by announcements of going-private transactions are a function of rival size relative to size of the target. To test whether abnormal returns of rival firms in response to IPO announcements are a function of rival's size, we classify rival firms based on whether their size is greater (lower) than

industry median. The intra-industry effects should be greater (smaller) for relatively smaller (larger) rival firms.

Rival market-to-book ratio:

Market-to-book ratio is a common proxy for growth opportunities. Rivals' growth opportunities may influence their ability to respond to the competitive threat of a new publicly traded firm within an industry or to incorporate new growth opportunities available in that industry.

If IPO announcements signal positive prospects for industry (i.e. future growth opportunities), then rivals with high market-to-book ratios are likely to react more positively than those with low market-to-book ratios. On the other hand, especially in less concentrated industries where competitive shifts in market shares might take place, low market-to-book ratio rivals may not have the ability to respond to the competitive threat of a new publicly traded firm with greater resources. Therefore, we predict a more positive reaction for rivals with high market-to-book ratios than that of rivals with low market-to-book ratio and a negative reaction for rivals with low-market-to-book ratios that operate in low concentrated industries. To test whether the rivals react differently in response to IPO announcements, we classify rival firms as high (low) market-to-book ratio firms if their market-to-book ratio is above (below) industry median. Market-to-book ratio is computed as market value of equity plus book value of liabilities divided by book value of total assets. We predict a positive relationship between the rivals' ability to take advantage of growth opportunities (or to respond to a competitive threat) and their reaction at the IPO announcements.

Industry concentration:

Stoughton, Wong, and Zechner (2001) explore the second most cited motivation for a firm's decision to go public, namely, the product market motive. The argument used to model the going public decision is based on the interaction between information generated by investors and analysts of a publicly traded firm, on the one hand, and consumers who discern product quality from the stock price, on the other hand. The model predicts that only better quality firms will go public. Therefore, going public announcements provide a signal to consumers that the IPO firm has a high quality product. This has a negative impact on rivals' profits, since they charge lower prices. The product market explanation of going public decisions is relevant especially in industries where the competitive dynamics play a major role for long term success of companies.

Generally, announcing an IPO conveys bad news for competitors in less concentrated industries, since the announcement might signal higher product quality to consumers and, thus, lowers the price the competitors can charge for their products/services. This prediction suggests that an IPO announcement in low concentrated industry is likely to reveal unfavorable information for its competitors leading to shift in comparative advantages for non-announcing firms. To test this implication, we classify rival firms in two groups: those that belong to highly concentrated industries, i.e. their industry Herfindhal Index (HI) is above the median index for all industries, and those that belong to less concentrated industries. The Herfindahl Index (HI) is computed as the sum of squared market share of each firm relative to all other firms within the four-digit SIC code. Market share is defined as the firm's annual sales at the end of fiscal year prior to the IPO announcement divided by industry sales.

H4: Cross-sectional differences in IPO externalities can be explained by specific characteristics of rival firms.

1.5. IPO price revisions and the valuation impact on rivals

The process of going public is a two-way information channel: the IPO firm reveals valuable information about its prospects and performance at the filing date and receives information from informed investors during the registration period known as book-building phase (Benveniste and Spindt, 1989). With bookbuilding, typically, a preliminary offer price range is set when firms file their prospectus with SEC. Then, underwriters and issuers market the offer to prospective investors. If there is a strong demand for the IPO, underwriter will set a higher offer price relative to mid file price. The difference between offer price and mid file price represents the price revisions. Upward/downward price revisions depend on the investors' demand for IPO and also the underwriter's willingness to keep underpricing within reasonable limits (i.e. "leaving less money on the table").

Lowry and Schwert (2002) explain the positive relation between initial returns and subsequent IPO volume as a consequence of information learned during the registration period. Positive information (upward price revisions) learned during an IPO's book-building phase results in a high initial return and, consequently, a higher market-to-book value for the IPO firm. If additional information revealed during book building affects not only the initial returns for the offering but also the subsequent volume of public offerings in the same industry, it implies valuation effects for similarly publicly traded firms. In other words, investors in similar firms use this information to reassess the value of their own firms' future prospects when they observe upward/downward price revisions. To test whether IPO price revisions have valuation effects on rival firms, we hypothesize that:

H5: Rivals experience positive (negative) wealth effects when an IPO undergoes an upward (downward) price revision on the offer date.

2. Data and Methodology

2.1. Sample Selection

In this study we examine the rivals' share price reactions in response to IPO announcements by industrial firms for the 1983-2001 period. The list of IPOs comes from Thompson Financial Security Database (SDC-Global Issue Database). In addition to the filing date and issue date, SDC also reports many aspects of the IPOs, such as: offer price, filing price (low, high, mid), venture backed IPOs, non-venture backed IPOs, etc.

SDC database contains 6,423 IPOs by industrial firms for the 1983-2001 period. We exclude the following IPOs: rights issue (1), unit IPOs (925), foreign IPOs (2), IPOs with offer price less than $5[1] (319) and IPOs not identifiable in the CRSP database. This step reduces the sample to 5,176 IPOs.

The final sample for industrial firms is constructed in a three-stage process as described below. In the first stage, we require that each IPO firm to have available financial information in the Compustat database (total assets, total liabilities, and shares outstanding) in the first year of listing. This allows us to compute size, growth options and relative size of IPO firm, since the IPO proceeds is not always a good proxy for the IPO firm size. This criterion reduces the sample to 3,810 IPOs.

In the second stage, the sample is further reduced when we construct the sample for new firms. In so doing, we follow three steps. First, we assign each firm for which daily stock returns are available on the CRSP files to a four-digit SIC code (see Lang and Stulz, 1992). We exclude IPOs that are in their first year of listing. Second, we construct a list of rival firms that do not have a major public announcements such as mergers, seasoned equity offerings, stock splits,

[1] Benveniste, Ljungqvist, Wilhelm and Yu (2003), Lowry and Schwert (2004), etc eliminate all IPOs whose offer price is $5 or less.

dividend and repurchases around IPO announcements (30 day period centered at the IPO filing date). Finally, to ensure that each IPO firm is matched with a representative portfolio of rivals, we require that each IPO has at least 5 rivals (same industry, same year), with required financial data (total assets, sales, total liabilities) available in the Compustat database.

The final sample of IPOs consists of 1,681 IPOs, with 38,791 rivals in 290 different four-digit SIC codes.

2.2. Descriptive statistics:

Table 1 presents the frequency of IPOs across years. There are 563 venture backed IPOs and 1,118-non venture backed IPOs for 1983-2001 period. The bulk of IPOs (40% of the sample) occurs during 1992-1997 period. Table 2 reports descriptive statistics of selected variables for IPO sample: proceeds, market-to-book ratio, and total assets. The median proceeds raised by venture-backed IPOs is $30 million, compared to $26 million of non-venture backed IPOs. In 12 out of 19 years, the median proceeds raised by venture-backed IPOs are greater than those of non-venture backed IPOs. The median market-to-book ratio of venture backed IPOs is 2.4, whereas that of non-venture backed IPOs is 1.8. The full sample of IPOs has a median market-to-book ratio of 2.0 and median total assets of $62 million, which are similar to those reported by Akhigbe et al. (2.05 and $50.36 respectively).

Table 3 describes the selected variables for rivals' sample. A total of 38,791 rivals were identified for the sample period in 290 different SIC codes. The exact composition of rival portfolios varies with the timing of the event. The average number of rivals per IPO event is 28.83, the median is 17, the minimum is 5 (to ensure a well representative portfolio of rivals) and the maximum is 408.

The market-to-book ratio is the ratio of market value of equity plus book value of total liabilities to book value of total assets. Total assets and sales are end-of fiscal year values from Compustat database. The median rival firm has $68.95 million in total assets, $69.37 million in sales and a market to book ratio of 1.54. Akhigbe et al. report a median market-to-book ratio of 1.1 and median total assets of $51.74 million for the industry rivals' sample. The differences might be explained by the fact that the authors match the IPOs with at least one rival firm in the same four-digit SIC code, whereas in this study we require at least five firms in the same four-digit SIC code to ensure a well representative portfolio.

2.3. Methodology

To capture the valuation effects of industry rivals in response to IPO announcements, we use event study methodology to measure the industry rivals' share price reaction. Day 0 is the registration date on the Registered Offerings of Securities tape of the Securities and Exchange Commission (SEC). Daily share prices for rivals' sample are from the Center for Research in Securities Prices (CRSP). To measure abnormal returns, we employ the market-adjusted model (Brown and Warner, 1985).

$A_{p,t} = R_{p,t} - R_{m,t}$, where $R_{m,t}$ is the return on the CRSP value weighted index for day *t*.

This model is well specified when securities come from the same industry group and especially when there is a clustering in events. Brown and Warner point out that there could be a high degree of cross-sectional dependence in market/market adjusted model and potential misspecification. To account for potential cross-correlation of returns induced by a clustering of industry observations in calendar time, we construct an equally weighted portfolio of rival firms within the same industry (4-digit SIC code) and perform event tests on the returns to the industry

portfolios. To test whether there is a significant difference in mean (median) cumulative abnormal returns (CAR) between two subsamples, we use t-test and Wilcoxon rank-sum test, respectively.

The next step is to analyze the cross-sectional variation in intra-industry information effects of IPO announcements. Previous studies show that industry characteristic, rival-specific characteristics and event-specific characteristics can explain the variations in intra-industry information effects. Based on theoretical predictions of going public decision, we estimate the following model:

$$RivalCAR_i = \alpha_0 + \alpha_1 CONCMKT_i + \alpha_2 RivalSIZE_i + \alpha_3 RivalM/B_i + \\ + \alpha_4 VCbackedIPO_i + \alpha_5 IPO\_SIZE_i + \alpha_6 M/B_i * CONCMKT_i + \varepsilon_i$$

The dependent variable is the three-day CAR of each industry rival in response to the announced initial public offering of firm *i*. $CONCMKT_i$ is the pre-IPO concentration level in the 4-digit SIC code. We use Herfindahl Index (HI) to measure the concentration level. The concentration variable is obtained by multiplying the HI by a dummy variable that takes on a value of one if rival operates in a highly concentrated industry and zero otherwise. $RivalSIZE_i$ equals 1 if the rival size (proxied by pre-IPO total assets) exceeds industry median. $RivalM/B_i$ equals 1 if the M/B ratio of rival firm exceeds industry median. $VCbackedIPO_i$ is an interactor variable that takes value of one if IPO is venture backed and zero otherwise. IPO_SIZE_i is the relative size of IPO firm computed as the ratio of IPO firm's total assets to rival's total assets.

3. Empirical Results

3.1. Rivals' valuation effects at the IPO announcement date:

We use three-day cumulative abnormal returns (CARs) for equally-weighted rival portfolios as a measure of information transferred from IPO firms to rivals. Table 4 presents both mean and median CARs for all rivals and for subsamples based on rivals' characteristics. Both mean (0.371%) and median (0.279%) CARs for the entire sample are positive and significantly different from zero, which suggest that going public decisions have positive externalities effects on existing publicly held firms that share a common valuation factor. Benveniste, Ljungqvist, Wilhelm and Yu (2003) find a positive effect of going public decisions on privately held firms within the same industry. The likelihood of going public is determined by the factors such as: previous IPOs' underpricing, price revisions, and withdrawals. They conclude that firms decide to go public when they observe positive outcomes (i.e. less underpricing) from their contemporaries (i.e. firms that go public in about the same time). The positive reaction for rivals support the hypothesis that going public decisions signal positive prospects for industry and this information conveyed at the filing date is transferred to similar publicly traded firms.

When discussing the hypotheses, we indicated that the net wealth effect of an IPO on its rivals is the sum of potentially two opposing consequences. It is possible that some rivals react positively and some negatively. Partitioning the rivals based on their characteristics (market-to-book value, size), generate different reactions in response to IPO announcements. Table 4 shows that rivals with market-to-book value higher than the industry median experience a positive and significant reaction (0.356%) in response to IPO announcements, whereas those with market-to-book value below industry median have no significant valuation changes (at the median level). The median reaction of large size rivals is positive and significant (0.302%), but the median

reaction of small size rivals is insignificant. This is inconsistent with previous studies in intra-industry information transfer that document a negative relation between the expected change in valuation induced by a public announcement and firm size (Atiase, 1985, and Slovin et al., 1991). It might be the case that the insignificant reaction of small size rivals is the result of offsetting positive and negative effects.

3.2. Variations in Rivals' Abnormal Returns

3.2.1. Univariate Analysis

The major hypothesis in this study is that venture backed IPOs signal positive information about the related industry and this has a significant positive impact on stock prices of rival companies. To shed more light on the rivals' valuation effects in response to IPO announcements, we analyze the rivals' CARs for two different subgroups, based on whether IPO is venture backed or not. Within each group, we split the sample into subgroups based on rivals' specific characteristics (market-to-book ratio, size and industry concentration). Previous studies show that venture backed IPOs convey positive signals to the market (Brav and Gompers, 1997) and, therefore, investors might incorporate these expectations at the filing date.

Table 5 shows the CARs for rival portfolios in response to venture backed IPOs (Panel A) and non-venture backed IPOs (Panel B). The median wealth effect experienced by rivals when an IPO is venture backed is positive (0.293%) and significant at the 1% level. The median CARs, however, are insignificant for rivals when IPOs are not venture-backed. These results imply that the average positive reaction of rivals is driven by the presence of venture backed IPOs. This is consistent with the hypothesis that a venture backed IPO signals better prospects for the IPO-affiliated industry than when an IPO is not backed by venture capitalist.

Table 5 also reveals that when IPOs are venture backed, higher M/B rivals enjoy positive and statistically significant wealth gains. Although lower M/B rivals show positive gain, this result is not significant. On the other hand, when IPOs are non-venture backed, higher M/B rivals experience positive but insignificant wealth gain, while lower M/B rivals negative (significant at the 10% level) abnormal returns. These results lead us to conclude that the positive effect signaled by venture-backed IPOs exceeds the negative (competitive) effect due to a new entrant, but when an IPO is not backed by venture capital, the negative effect is more pronounced for lower M/B (poorer performing) rivals.

Based on industry concentration level, rivals reaction in response to venture backed IPOs, is positive and significant, but insignificant in response to non venture backed IPOs. This suggests that regardless of the level of competition in the industry they operate, investors in rival firms interpret the positive signal of venture backed IPO announcements as having industry wide implications. The magnitude of rivals' reaction is higher for those in less concentrated (more competitive) industries (0.390%) than those in highly concentrated industries (0.240%). However, the differential impact is not statistically significant. It seems that rival firms in highly concentrated industries get lower net benefits from the positive information signaled by venture backed IPO announcements. In the absence of a venture-backed IPO, neither high- nor low-concentration rivals win.

Lang and Stulz (1992) provide the important result that information transfer can differ across industries depending on the concentration level. Their results suggest that an announcement made by a firm in a low concentrated industry is likely to reveal comparative information for industry rivals. Following their procedure, we use Herfindhal Index to split the

rivals in highly concentrated (above median HI) and less concentrated (below median HI) groups.

Table 6 shows the mean and median 3-day CARs for both groups. At the mean level, rivals in low concentrated industries (i.e. high competition) have a higher reaction than those in highly concentrated industries; however, the difference between the two groups (High-Low) is not statistically significant.

To further examine the impact of industry concentration level on rivals' reaction in response to IPO announcements, we measure the information transferred based on various cross-classifications: industry concentration and rivals' market-to-book value and industry concentration and rivals' size. Table 7 presents the mean and median 3-day CARs for rival portfolios based on both rivals' and industries' specific characteristics. Panel A shows the rivals' reaction in response to venture backed IPOs. The significant negative CAR of 0.14% suggests that rivals with low market-to-book value that operate in less concentrated industries have a competitive disadvantage when a competitor goes public. This is consistent with the hypothesis that, in a competitive environment (low concentration), rivals with low growth opportunities (poor performing rivals) do not have the ability to respond to the competitive threat of a new entrant. Rivals with high market-to-book value experience positive valuation effects (0.07%) if they operate in highly concentrated industries and have no significant valuation changes if they operate in less concentrated industries. Consistent with Atiase's (1985) argument, rivals' size plays an important role in information transferred. Depending on the level of concentration and rival's size, the magnitude of information transferred differs. At the median level, for example, small size rivals' CAR is more pronounced in less concentrated industries (-0.19%) than in

highly concentrated industries. These results suggest that small size rivals are more vulnerable in a competitive environment.

When IPOs are not venture backed, all rivals irrespective of the quality (above- and below median M/B) or size (above- or below-median size) lose (significant at least at the 10% level) in less concentrated industries. This result implies that in the absence of venture capitalists at the time of IPO, competitive effect is more pronounced.

3.2.2. Relative size of IPO firm

The size of IPO firm relative to the size of industry rivals may convey different information to industry rivals. The larger the relative size of IPO firm, the greater the impact on industry rivals' reactions, because large IPO firms convey more information for industry counterparts. Table 8 shows the impact of IPO firms' size on industry rivals' valuation effects. Rivals are classified in quartiles, based on the relative size of IPO firm (smallest IPO firms-1, largest IPO firms-4). Except for quartile 1, both mean and median rivals CARs are positive and significant. This suggests that relatively small IPO firms do not have a significant impact on rivals, but as the relative size of IPO firm increases (quartile 2 to quartile 4), rivals experience significant wealth gains in response to IPO announcements. This finding is consistent with the hypothesis that the larger the relative size of IPO firm, the higher the rivals' reaction. The difference in mean/median between quartile 1 and quartile 4 is significantly different for all windows. This implies that larger IPOs (Q4) convey more information than smaller IPOs (Q1) and this information has industry-wide implications.

3.2.3. Multivariate analysis

The univariate results provide evidence that rival firms react differently to IPO announcements depending upon event specific characteristics and rivals' specific characteristics. To examine the cross-sectional variation in intra-industry information effects of IPO announcements, we estimate the following model:

$$RivalCAR_i = \alpha_0 + \alpha_1 CONCMKT_i + \alpha_2 RivalSIZE_i + \alpha_3 RivalM/B_i + \\ + \alpha_4 VCbackedIPO_i + \alpha_5 IPO\_SIZE_i + \alpha_6 M/B_i * HI_i + \varepsilon_i$$

The abnormal returns are computed for each individual rival using market-adjusted model. The dependent variable is the 3-day cumulative abnormal returns of each individual rival and the independent variables are factors that may explain the variation in rivals' valuation effects in response to IPO announcements. $CONCMKT_i$ is the pre-IPO concentration level in the 4-digit SIC code. Herfindahl Index (HI) measures the concentration level. The concentration variable is obtained by multiplying the HI by a dummy variable that takes on a value of one if HI>median and zero otherwise. $RivalSIZE_i$ equals 1 if the rival size (proxied by total assets, prior to the IPO announcement) exceeds industry median. $RivalM/B_i$ equals 1 if the M/B ratio of rival firm exceeds industry median. $VCbackedIPO_i$ is an interactor variable that takes value of one if IPO is venture backed and zero otherwise. IPO_SIZE_i is the relative size of IPO firm computed as the ratio of IPO firm's total assets to rival's total assets.

Table 9 presents the cross-sectional results based on individual rivals' CARs at the IPO filing date. Model 1 shows the results when only the factors related to IPO's specific characteristics are included in the model. Consistent with findings in the univariate analysis,

rivals have positive and significant valuation effects (0.360%) when the IPO is venture backed. This result is consistent with Lerner (1994) and Brav and Gompers (1997) who demonstrate that venture backed IPOs are successful in timing the market and better than non-venture backed IPOs. The implication is that the signaling and timing ability of venture backed IPOs have a positive impact on industry rivals; they experience significant positive valuation effects because investors reassess the value of similar existing publicly traded firms at the time a venture capitalist brings a firm public. The positive coefficient estimate on relative size of IPO firm (0.055%) suggests that the larger the size of IPO firm relative to industry counterparts, the higher the individual rival's reaction. This suggests that larger IPO firms relative to their rivals convey more information than small IPO firms.

Model 2 presents the results for factors related to industry and rivals' specific characteristics. The degree of industry concentration and level of rivals' growth opportunities are positively related to rival valuation effects. However, the coefficient estimate on rival size is not statistically significant. This implies that rival size is not an important determinant in explaining cross-sectional variation in individual rivals' valuation effects.

Model 3 controls for both event specific factors and rivals specific factors, simultaneously. The results are qualitatively similar to those reported when the models are estimated separately.

Model 4 adds the interaction between market-to-book ratio and concentration level measured by Herfindahl Index. There are four possible categories: high M/B, high HI; high M/B, low HI; low M/B, high HI and low M/B, low HI. For this case, a set of binary variables is necessary. To avoid the dummy variable trap, we drop the dummy variable for the last category (low M/B, low HI). The coefficient for high M/B, high HI category is positive (0.376%) and

significant at 5% level which implies that rivals with high growth options in highly concentrated industries have higher reaction than those with low growth options that operate in less concentrated industries. Rivals with high market-to book value that operate in less concentrated industries also have higher reaction than those with low market-to-book value in less concentrated industries (0.168%). This suggests that in a competitive environment, rivals with high market-to-book value have a higher propensity to take advantage of growth options signaled at the IPO filing date, or to respond to a competitive threat of a new incumbent. Low market-to-book rivals that operate in highly concentrated industries react more than those with the same degree of valuation but operating in less concentrated industries (0.217%). These results are consistent with those presented in Table 7.

3.3. Impact of Price Revisions on Rivals' Valuation

The book-building phase (the period between filing date and offer date) is a two-way information channel. Going public firms reveal information at the time they file an initial public offering prospectus and receive information (positive/negative) from informed investors during the road show. Based on the type of information received, firms adjust the offer price (upward/downward) and make public the new information at the time of listing. To test the hypothesis that price revisions have a significant impact on rivals in the same industry, we divide the IPO sample in upward price revisions and downward price revisions. Then, we calculate rival portfolios CARs for different event windows (day 0 is the offer day). Table 10 shows the median CARs for rival portfolios in response to upward/downward IPO price revisions. For all event windows, the median CARs is negative and statistically significant in response to downward price revisions. As expected, negative information revealed in the form of downward price

revisions makes rivals worse off and this can be explained as rivals being overly optimistic about the future prospects within the industry at the time the IPO firm files with SEC. On the other hand, the median CARs is insignificant in response to upward price revisions, which suggests that rivals do not react to subsequent information released, if this information is positive. It might be the case that they already incorporated the positive information generated by going public decisions at the filing date, or there are offsetting positive and negative effects. To further examine the impact of price revisions on rival's valuation effects, we examine the variation of industry rival portfolios CARs for subsamples of venture backed IPOs and non-venture backed IPOs. Table 11 (Panel A) shows that for venture-backed IPOs, downward price revisions have negative impact on rivals, while upward revisions create positive wealth for rivals. However, wealth loss under downward revision far exceeds the wealth gains resulting from upward revisions. Upward price revision information generates opposite reactions for industry rivals. Positive and significant reaction is documented for venture backed IPOs sample (0.111%) but negative and significant reaction for non-venture backed IPOs sample (-0.228%). This implies that investors in rival firms interpret the positive information at the offering day as good news for industry only when this is certified by a venture capitalist.

In Panel B, the results show that regardless of rivals' characteristics, downward price revisions adversely affect rival firms within the same industry. The magnitude of information transfer is higher for small size, low market-to-book rivals and for those in less concentrated industries. Rivals reaction in response to upward price revisions is differentiated based on their characteristics. The results show that only high market-to-book rivals have the ability to take advantage of positive prospects available in the industry. However, their reaction is small (0.019%) and marginally significant at 10% level.

Overall, the results in Table 11 are consistent with hypothesis that negative information revealed in the form of downward price revisions adversely impacts rival firms within the same industry.

4. Summary and conclusions

This study provides evidence that going public decisions have positive informational externalities on existing publicly traded firms within the same industry. The positive valuation effects of rival firms are driven by venture backed IPOs externality which indicates that the presence of venture capitalists signals positive prospects for industry and this information is transferred to industry rivals. This finding is consistent with hypothesis that a venture backed IPO signals superior information to the market than a non-venture backed IPO and investors react differently depending on the event specific characteristics. Another important result is that rivals with high market-to-book value experience positive and significant valuation effects in response to venture backed IPOs and low market-to-book value rivals have negative and significant valuation effects in response to non-venture backed IPOs. This implies that high market-to-book rivals have the ability to incorporate future growth opportunities available within an industry when this information is signaled at the filing date. On the other hand, low market-to-book rivals that operate in less concentrated industries may have a competitive disadvantage when a non-venture backed IPO firm enters, probably because the newly public firm is more technologically advanced than its rivals.

One important factor that influences the direction and magnitude of rivals' valuation effects is the relative size of IPO firm. The evidence suggests that the larger the size of IPO firm

relative to industry counterparts, the greater the impact on rivals. Rivals experience more positive wealth effects when a relatively larger firm goes public.

When a venture-backed IPO undergoes downward price revision at the offering date, it entails negative valuation consequence for rivals. However, the opposite does not hold when upward price revisions occur. It might be the case that they already incorporated the positive information generated by going public decisions at the filing date.

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Table 1

Frequency of IPOs across years

The sample consists of all IPOs by industrial firms during the 1983-2001 period that satisfy the following criteria: (a) firms have financial data on Compustat during 1983-2001 (both active and research); (b) there are at least five rival firms within the same four-digit SIC code for any given IPO event; (c) the offer price is at least $5 and information about filing price range exists in SDC. The final sample consists of 1,681 IPO events; of these, 563 are venture backed IPOs and 1,118 are non-venture backed IPOs.

Year	Venture Backed IPOs	Non Venture Backed IPOs	Total
1983	35	62	97
1984	16	42	58
1985	19	52	71
1986	35	69	104
1987	20	76	96
1988	14	27	41
1989	17	24	41
1990	22	23	45
1991	29	38	67
1992	58	55	113
1993	57	76	133
1994	27	98	125
1995	29	71	100
1996	52	103	155
1997	36	100	136
1998	15	79	94
1999	32	55	87
2000	39	40	79
2001	11	28	39
Total	**563**	**1,118**	**1,681**

Table 2
Descriptive statistics for IPOs sample

The sample consists of all IPOs by industrial firms during the 1983-2001. To enter in the sample, the following criteria are required: firms have financial data on Compustat during 1983-2001 (both active and research), there are at least five rival firms within the same four-digit SIC for any given IPO event and the offer price is at least $5 and information about filing price range exists in SDC. Market value is computed as market value of equity plus book value of total liabilities. Market/Book is the ratio of market value to total assets.

	Non-Venture Backed IPOs				**Venture Backed IPOs**				**Full Sample**			
Year	*N*	*Proceeds*	*Market/ Book Value*	*Total Assets*	*N*	*Proceeds*	*Market/ Book Value*	*Total Assets*	*N*	*Proceeds*	*Market/ Book Value*	*Total Assets*
		Medians				Medians				Medians		
1983	62	13.4	1.8	31.9	35	15.3	2.5	26.9	97	14.9	2.0	29.0
1984	42	7.8	1.5	23.6	16	12.0	1.9	33.7	58	8.6	1.6	27.9
1985	52	11.7	2.1	30.7	19	15.2	1.8	34.4	71	13.0	2.1	33.5
1986	69	12.0	1.7	31.7	35	14.9	2.1	34.6	104	12.2	1.8	31.9
1987	76	15.1	1.5	47.6	20	17.6	1.7	41.3	96	16.5	1.5	45.6
1988	27	17.2	1.8	69.7	14	15.9	2.5	44.9	41	16.5	2.3	57.7
1989	24	20.9	1.5	113.0	17	15.2	2.3	36.7	41	19.6	2.0	62.2
1990	23	22.5	1.3	54.8	22	24.6	1.9	66.4	45	24.2	1.5	62.7
1991	38	24.9	1.7	87.8	29	32.5	2.8	65.3	67	29.0	2.2	75.6
1992	55	34.4	2.0	75.2	58	32.1	2.4	61.8	113	33.4	2.1	69.9
1993	76	22.7	1.9	70.8	57	27.0	2.0	56.1	133	25.2	2.0	64.9
1994	98	22.5	1.8	44.0	27	17.6	2.3	38.6	125	22.4	1.8	43.7
1995	71	31.5	2.3	75.1	29	33.6	2.7	63.8	100	33.5	2.3	66.6
1996	103	31.9	2.4	58.8	52	43.0	2.5	68.0	155	33.6	2.4	63.2
1997	100	29.0	2.1	67.7	36	35.9	3.8	65.3	136	32.8	2.3	67.6
1998	79	55.3	1.5	152.4	15	35.0	1.9	66.8	94	49.5	1.7	105.5
1999	55	54.0	2.4	153.8	32	67.9	3.4	138.9	87	64.4	3.4	146.7
2000	40	77.0	1.6	155.1	39	75.0	2.2	105.3	79	75.0	1.9	135.6
2001	28	106.1	2.3	193.5	11	90.0	2.5	193.7	39	93.8	2.4	193.7
Total	**1,118**	**26.0**	**1.8**	**63.1**	**563**	**30.0**	**2.4**	**60.8**	**1,681**	**27.5**	**2.0**	**62.0**

Table 3

Descriptive Statistics for Rivals' Sample

The sample consists of all rival firms for 1983-2001 period that satisfy the following criteria: they have daily stock returns available in the CRSP database, there are at least 5 rival firms in each four-digit SIC code with available financial data in the Compustat database for any given IPO, rival firms have no major confounding event around IPO announcements.

Year	Rival firms			
	N	Total Assets	Sales	M/B
		Median	Median	Median
1983	1,616	44.46	56.32	1.48
1984	1,170	37.94	46.75	1.34
1985	1,432	37.19	47.19	1.43
1986	2,041	40.72	43.51	1.38
1987	1,884	45.05	46.94	1.27
1988	1,058	32.14	35.32	1.29
1989	1,153	46.68	48.98	1.39
1990	1,200	40.63	43.39	1.27
1991	1,424	51.38	65.82	1.55
1992	2,225	61.82	67.18	1.48
1993	2,661	69.59	79.63	1.57
1994	2,743	77.65	86.06	1.49
1995	2,647	78.37	80.97	1.75
1996	3,266	87.41	87.67	1.68
1997	3,336	84.34	77.26	1.78
1998	2,749	89.23	83.07	1.61
1999	2,167	115.05	104.27	1.90
2000	2,473	120.48	96.20	1.57
2001	1,546	104.65	65.87	1.83
Total	**38,791**	**68.95**	**69.37**	**1.54**

Table 4

Rivals' reaction in response to IPO announcements

This table presents 3-day mean and median announcement period cumulative abnormal return (%) for rival portfolios in response to initial public offerings conducted during 1983-2001 period. The abnormal returns are equally weighted market adjusted returns. N is the number of observations that have the same four-digit SIC code as IPO firms, have no major confounding event around IPO announcements and have announcement period return available on CRSP. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	N	Mean	Median
All rivals	38,791	0.371***	0.279**
Large size rivals (above industry median)	21,162	0.302***	0.258**
Small size rivals (below industry median)	17,629	0.433***	0.061
High M/B rivals (above industry median)	19,177	0.618***	0.356***
Low M/B rivals (below industry median)	19,614	0.139	-0.103

Table 5
CARs for rival industry portfolios partitioned by event and rivals' characteristics

This table shows 3-day CARs based on whether IPOs are venture backed or not. Within each group, I split the sample in subgroups based on rivals' specific characteristics (market-to-book ratio, size, and industry concentration level). The market-to-book ratio is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival size is proxied by total assets. The level of concentration is measured by Herfindahl Index (HI) defined as the sum of square market share of each firm in the four-digit SIC code. Panel A presents the mean and median CARs for rival industry portfolios in response to venture-backed IPO announcements. Panel B presents the mean and median CARs for rival industry portfolios in response to non-venture backed IPO announcements. The t-statistic and Wilcoxon-Z are used to test statistical differences in mean and median between two subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	Panel A: Rivals' reaction in response to venture backed IPOs			Panel B: Rivals' reaction in response to non-venture backed IPOs			Difference (VC-non VC)	
	N	Mean	Median	N	Mean	Median	Mean	Median
All	14,534	0.511***	0.293***	24,257	0.060	-0.063	0.451*	0.356***
> median M/B	7,085	0.578***	0.377**	12,092	0.201*	0.110	0.377*	0.267**
≤ median M/B	7,449	0.478***	0.177	12,165	-0.062	-0.192*	0.540**	0.369**
Mean Difference (High-Low)		0.100			0.263*			
Median Difference (High-Low)			0.200			0.302*		
>median size	7,892	0.311***	0.168	13,270	0.085	-0.032	0.226*	0.200*
≤median size	6,642	0.726***	0.270	10,987	-0.009	-0.143	0.735***	0.413**
Mean Difference (Large-Small)		-0.415			0.094			
Median Difference (Large-Small)			-0.102			0.111		
> median HI	6,684	0.570**	0.240*	11,811	0.001	-0.080	0.569**	0.320**
≤ median HI	7,850	0.400**	0.390*	12,446	0.200*	-0.040	0.200	0.430***
Mean Difference (High-Low)		0.170			-0.200			
Median Difference (High-Low)			-0.150			-0.040		

Table 6

Rivals' cumulative abnormal returns classified by level of concentration

This table shows mean and median 3-day equally weighted market adjusted returns for rival firms classified by level of concentration. The level of concentration is measured by Herfindahl Index (HI) defined as the sum of square market share of each firm in the four-digit SIC code. The market share is the firm's annual sales at the fiscal year-end prior to IPO announcement as a percentage of the industry's. The t-statistic and Wilcoxon-Z are used to test statistical differences in mean and median between two subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

HI	N (rivals)	Mean	Median
>median	18,495	0.175*	0.023
≤median	20,296	0.270**	0.115
Difference in mean		-0.096	
Difference in median			-0.093

Table 7

Two-way classification of industry rivals' portfolios

This table presents the mean (median) 3-day rivals' CARs based on various cross-classifications. HI is the Herfindhal Index defined as the sum of square market share of each firm in the four-digit SIC code. The market share is the firm's annual sales at the fiscal year-end prior to IPO announcement as a percentage of the industry's. The market-to-book ratio is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival size is proxied by total assets. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

A. Venture Backed IPOs (N=563)

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median M/B	3331	0.75**	0.07*	3754	0.38*	-0.11
Below median M/B	3353	0.50**	-0.13	4096	0.21	-0.14*

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median size	3679	0.36**	-0.03	4213	0.20*	-0.08
Below median size	3005	0.93**	-0.08	3637	0.41	-0.19*

B. Non Venture Backed IPOs (N=1,118)

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median M/B	5866	0.24*	-0.24*	6226	0.06	-0.23*
Below median M/B	5945	0.00	-0.34**	6220	0.04	-0.49**

	Above median HI			Below median HI		
		CAR (%)			CAR (%)	
	N	Mean	Median	N	Mean	Median
Above median size	6367	0.17*	-0.15	6903	0.00	-0.27*
Below median size	5444	0.06	-0.47**	5543	0.03	-0.48*

Table 8

The impact of the relative size of IPO firm on industry rivals

This table shows the median/mean CARs for rival portfolios classified by the relative size of IPO firm. Rival firms include firms on Compustat that have the same four-digit SIC code as IPO firm, do not a have a major public announcement around IPO filing date and have returns available on CRSP database. The sample covers the 1983-2001 period. The relative size of IPO firm is defined as the ratio of IPO firm's total assets to rival's total assets. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A	**Relative size of IPO firm**				
	Q 1 Smallest IPO firms	**Q 2**	**Q 3**	**Q4** Largest IPO firms	**Q1-Q4**
	Median	Median	Median	Median	p-value
CAR (-1, 0)	0.12	0.15***	0.23***	0.18***	0.00
CAR (-1,1)	0.12	0.25***	0.29***	0.33***	0.03
CAR (-2, 2)	0.11	0.36**	0.41***	0.63***	0.00

Panel B	**Relative size of IPO firm**				
	Q 1 Smallest IPO firms	**Q 2**	**Q 3**	**Q 4** Largest IPO firms	**Q1-Q4**
	Mean	Mean	Mean	Mean	p-value
CAR (-1, 0)	-0.01	0.18**	0.23***	0.20***	0.01
CAR (-1,1)	0.11	0.17**	0.19**	0.28***	0.01
CAR (-2, 2)	0.08	0.22**	0.30**	0.47***	0.00

Table 9

Cross-sectional variation in rivals' valuation effects

This table shows the results of individual rival valuation effects in response to an IPO filing. The dependent variable is the 3-day individual rival abnormal returns. Relative size of IPO firm is the ratio of IPO firm's total assets to rival's total assets. VC backed IPO is equal to 1 if IPO is venture backed and zero otherwise. HI is equal to 1 if the rival operates in a highly concentrated industry and zero otherwise. Rival's M/B equals 1 if it exceeds the industry median. M/B is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival's relative size equals 1 if rival size exceeds the industry median. Rival size is proxied by its total assets. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

	Model 1	**Model 2**	**Model 3**	**Model 4**
Intercept	0.111***	0.187**	0.160	0.223
Relative size of IPO firm	0.055**		0.055**	0.061**
VC backed IPO	0.360***		0.354***	0.335***
HI dummy		0.144*	0.161*	
Rivals' M/B		0.084**	0.090**	
Rival size relative to industry		-0.109	-0.118	-0.199
High M/B, High HI				0.376**
High M/B, Low HI				0.168**
Low M/B, High HI				0.217*
R^2	0.093	0.095	0.103	0.110

Table 10

Rivals' cumulative abnormal returns in response to IPO price revisions

This table presents the median CARs for rival firms classified by the direction of IPO price revisions (upward and downward). The event day (0) is the offering day. The sample covers the 1983-2001 period. Price revisions equal the ratio of (offer price-mid filing price) to mid filing price. The Wilcoxon rank sum test performs statistical differences in median between two independent subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

		Median CARs		
		(-1, 0)	(-1, 1)	(-2, 2)
IPO price revisions*	Upward (N=647 IPOs)	-0.067	-0.074	-0.225
	Downward (N=840 IPOs)	-0.220***	-0.333***	-0.398***
Difference in median		-0.153***	-0.259***	-0.172***

*194 IPOs have no price revisions

Table 11
Impact of price revisions partitioned by event and rivals' specific characteristics

This table shows 3-day rivals CARs in response to upward/downward price revisions (day 0 is the offer day). Within each group (downward/upward), I split the sample in subgroups based on event characteristics (venture backed or non-venture backed IPOS) and rivals' specific characteristics (market-to-book ratio, size, and industry concentration level). The market-to-book ratio is the ratio of market value of equity plus book value of liabilities to book value of total assets. Rival size is proxied by total assets. The level of concentration is measured by Herfindahl Index (HI) defined as the sum of square market share of each firm in the four-digit SIC code. Panel A shows the impact of price revisions and event specific characteristic. Panel B shows the impact of price revisions and rivals' specific characteristics. The t-test and Wilcoxon rank sum test performs the statistical differences in means/medians for two subsamples. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively.

Panel A: Impact of price revisions and event specific characteristics

	Downward price revisions			Upward price revisions				
		CAR (%)			CAR (%)		Difference (D-U)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Venture backed IPOs	5,894	-0.260**	-0.313**	7,351	0.190**	0.111*	-0.450**	-0.424**
Non-venture backed IPOs	11,674	-0.240*	-0.341**	9,022	-0.350**	-0.228*	0.110	-0.113
Difference (non-VC-VC)		0.020	-0.028		-0.540*	-0.339*		

Panel B: Impact of price revisions and rivals' specific characteristics

	Downward price revisions			Upward price revisions				
		CAR (%)			CAR (%)		Difference (D-U)	
	N	Mean	Median	N	Mean	Median	Mean	Median
Above median size	9,651	-0.234*	-0.302**	9,036	0.040	0.051	-0.274*	-0.353**
Below median size	7,917	-0.384**	-0.367**	7,337	-0.230**	-0.259*	-0.154*	-0.108
Difference (S-L)		-0.150*	-0.065		-0.270**	-0.310**		
Above median M/B	8,700	-0.210	-0.230**	7,993	0.100	0.019*	-0.310**	-0.249**
Below Median M/B	8,868	-0.471*	-0.410**	8,380	0.231**	-0.165*	-0.702***	-0.245*
Difference (L-H)		-0.261*	-0.18		0.131	-0.184**		
Above median HI	8,654	-0.144**	-0.227**	7,479	-0.054	-0.102	-0.090	-0.125
Below median HI	8,914	-0.365**	-0.415**	8,894	-0.014	-0.038	-0.351***	-0.377**
Difference (L-H)		-0.221*	-0.188		0.040	0.064		

*194 IPOs have no price revision