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The Post-Issue Operating Performance of IPO Firms

BHARAT A. JAIN and OMESH KINI*

ABSTRACT

This article investigates the change in operating performance of firms as they make the transition from private to public ownership. A significant decline in operating performance subsequent to the initial public offering (IPO) is found. Additionally, there is a significant positive relation between post-IPO operating performance and equity retention by the original entrepreneurs, but no relation between post-IPO operating performance and the level of initial underpricing. Post-issue declines in the market-to-book ratio, price/earnings ratio, and earnings per share are also documented.

WE INVESTIGATE THE CHANGE in operating performance of firms as they make the transition from private to public ownership through initial public offerings (IPOs). Although a few recent studies investigate the performance of IPO firms, they typically focus on the post-issue stock price performance.¹ One exception is DeGeorge and Zeckhauser (1993) who examine the operating performance of a special type of IPO firm—reverse leveraged buyouts (LBOs). This is the first study that attempts to measure the operating performance of IPO firms that are not reverse LBOs.

We find that IPO firms exhibit a decline in post-issue operating performance, as measured by the operating return on assets and operating cash flows deflated by assets, relative to their pre-IPO levels, both before and after industry adjustment. The decline in operating performance of IPO firms, however, comes with a caveat. These firms exhibit high growth in sales and capital expenditures relative to firms in the same industry in the post-IPO period. Thus, the declining operating performance of IPO firms cannot be attributed to a lack of sales growth opportunities or cutbacks in post-IPO capital expenditures. We also find that IPO firms where entrepreneurs retain higher ownership generally demonstrate superior performance relative to other issuing firms both before and after adjustment for industry effects. We

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¹ See Ritter (1991) and Loughran and Ritter (1995) for evidence regarding post-IPO investment performance and Lang (1991) for the effect of post-IPO earnings announcements on stock returns.

find no relation between post-issue changes in operating performance and initial returns at the IPO.

The decline in post-issue operating performance is inconsistent with the fact that IPO firms are initially priced at high price-earnings (P/E) multiples, implying that investors have expectations of high earnings growth in the future. IPO firms start out with high market-to-book (M/B) and P/E ratios relative to their industry counterparts but experience a decline in these measures after the IPO. In addition, earnings per share (EPS) also decline with time. Overall, these results suggest that investors appear to value firms going public based on the expectation that earnings growth will continue, while in actuality the pre-IPO profit margins, on which the expectations are formed, are not even sustained.

There are a number of potential explanations for the decline in the post-issue operating performance of IPO firms. One explanation is related to the potential for increased agency costs when a firm makes the transition from private to public ownership. The reduction in management ownership that occurs when a firm goes public is likely to lead to the agency problem described in Jensen and Meckling (1976). As a result of the heightened conflict of interest between initial owners and shareholders, the performance of the firm could suffer as managers have incentives to increase perquisite consumption. Using the proceeds from the IPO in nonvalue maximizing projects is one manifestation of perquisite consumption.² A second reason could be that managers attempt to window-dress their accounting numbers prior to going public. This will lead to pre-IPO performance being overstated and post-IPO performance being understated. A third explanation for the decline in operating performance is that entrepreneurs time their issues to coincide with periods of unusually good performance levels, which they know cannot be sustained in the future. The common threads running through these three explanations for the post-issue decline in operating performance are the presence of information asymmetry and/or a conflict of interest between the original entrepreneurs and the new shareholders.³

The natural question that arises is whether the long-run decline in operating performance subsequent to the IPO is anticipated by the market. Stein (1989), using a signal-jamming model, shows that, even in efficient capital markets, myopic behavior like window-dressing may persist since it is a Nash

² Kaplan (1989), Muscarella and Vetsuypens (1990), and Smith (1990) document the superior operating performance of firms that make the transition from public to private ownership through LBOs or management buyouts (MBOs). A common argument to explain the operating efficiency gains is related to the reduced conflict of interest between managers and owners in a closely held firm. Since IPOs represent the opposite of the spectrum relative to LBOs and MBOs, we would expect a decline in operating performance as a result of increased conflicts of interest between managers and shareholders resulting from the dilution of the entrepreneur's ownership interest.

³ An additional explanation (Jensen (1993)) is that capital flowing into an industry may lead to overinvestment, resulting in price wars and subcompetitive profit margins. This argument suggests that controlling for industry effects may understate the decline in operating performance.

equilibrium. In the context of IPOs, his model implies that managers may attempt to manipulate investors' beliefs by pumping up pre-IPO earnings. In equilibrium, the market is not fooled by this behavior and correctly anticipates and accounts for it in its valuation of the firm. The more intuitive equilibrium in which managers avoid window-dressing and, therefore, investors do not need to account for it, cannot be sustained as a Nash equilibrium. Stein's signal-jamming model can also be extended to show that, in equilibrium, managers may attempt to time issues and that rational investors anticipate and account for this behavior. If the market is able to account for such actions, the long-run investment performance of IPO firms should be normal. However, the long-run investment underperformance documented by Ritter (1991) and Loughran and Ritter (1995) suggests that the decline in operating performance is not anticipated and investors are constantly surprised by the poor performance of IPO firms.⁴ Our findings of post-issue declines in the M/B ratio, P/E ratio, and EPS are consistent with this interpretation, suggesting that potential investors initially have high expectations of future earnings growth, which are not subsequently fulfilled.

The documented positive relation between managerial ownership retention and post-issue operating performance is consistent with several explanations. Primary among these are the Jensen and Meckling (1976) agency hypothesis and the Leland and Pyle (1977) signaling hypothesis. According to the agency hypothesis, higher ownership retention by managers reduces their incentives to undertake nonvalue maximizing projects. Leland and Pyle (1977) suggest that, by retaining a significant ownership stake in the firm, entrepreneurs can signal project quality since false representation can be costly. Both hypotheses, therefore, predict relatively superior operating performance of IPO firms with higher entrepreneurial ownership. While our results are consistent with the predictions of both the agency theory and the signaling hypothesis, it is difficult, if not impossible, to separate out their individual effects.

Recently, Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) have suggested that issuers use underpricing as a mechanism to signal their quality to the market. These models posit that high-quality firms underprice their stock at the IPO and subsequently conduct a seasoned offering when market prices are established and there has been an opportunity for information revelation. The cost of underpricing and a positive probability of their type being revealed between the two offerings prevent the low-quality firms from following suit. Thus, signaling models of underpricing predict that IPO firms that underprice should exhibit superior operating performance in comparison to those that do not. The absence of a positive relation between the change in operating performance and underpricing is inconsistent with the signaling explanation for underpricing. However, since

⁴ Lang (1991) studies the effect of earnings announcements on stock returns. He finds that the variance of the stock price response to earnings announcements by issuing firms decreases over time.

we test the joint hypothesis of underpricing as a signal of quality and that our measures of operating performance represent firm quality, the rejection of our hypothesis does not allow us to unequivocally discard the signaling hypothesis.

In a related article, Degeorge and Zeckhauser (1993) measure the change in operating performance of firms that experienced reverse LBOs, a special class of IPOs. They find that reverse-LBO firms substantially underperform comparison firms in the post-IPO period. Reverse-LBO firms, however, are not representative of a typical firm going public. For instance, these companies are not likely to suffer from an acute information asymmetry problem since they were once publicly traded and have relatively longer prior operating history. Further, as Degeorge and Zeckhauser (1993) point out, reverse-LBO firms tend to be larger than the average IPO firm and carry higher levels of debt. They report that almost all the firms in their sample mention debt reduction as one of the main (or only) motivations for going public. In contrast, IPO firms commonly cite raising capital to finance growth projects as a reason for going public. Since reverse-LBO firms are fundamentally different from other IPO firms in terms of information asymmetry as well as in their proposed motivation for a public offering, it is important to study the operating performance changes of these firms separately.

The article is organized as follows. Section I provides a description of the sample. Section II presents empirical results related to the operating performance of IPO firms. Section III provides evidence on market expectations and post-issue earnings performance. Finally, Section IV presents the conclusions.

I. Sample Description and Data Sources

Our initial sample of firm commitment IPOs is collected for the period 1976 to 1988 using the following two sources: (1) *Going Public: The IPO Reporter* and (2) *Investment Dealers Digest's Five-year Directory of Corporate Financing*. It consists of 2,126 firm commitment IPOs that meet the following criteria: (1) the offer price was at least 5 dollars, (2) the issue raised at least 1.5 million dollars, and (3) the issue is not a reverse LBO, an IPO of a closed-end mutual fund, a unit issue, or a real estate investment trust. Our next requirement is that the COMPUSTAT tapes (primary industrial, supplementary industrial, tertiary, full-coverage, and industrial research files) have data for each firm for the fiscal year prior to the IPO. We do not require that these firms have post-IPO financial data on the COMPUSTAT tapes. Consequently, the number of firms in the sample varies for different time windows under consideration. Our final sample consists of 682 firm-commitment IPOs.⁵

⁵ In order to determine whether the inclusion of reverse LBOs materially affects our results, we identify a sample of 90 reverse LBOs issued during our sample period. Out of these firms, 69 have financial information for fiscal Year -1 on COMPUSTAT. We calculate results for the sample of 751 firms (our original sample of 682 IPOs plus the sample of 69 reverse LBOs). Our results are qualitatively similar with the inclusion of reverse LBOs in the sample.

Summary statistics for our sample are provided in Table I. The largest number of IPOs take place during the year 1983. Only 12 IPOs in our sample occur prior to 1980. The number of IPOs in our sample as a percentage of those in a more comprehensive sample such as Loughran and Ritter (1993) varies considerably from year to year. It is possible, although we believe unlikely, that our data selection criteria may have caused an inadvertent survivorship bias.

In Panel B of Table I, the characteristics of the sample are outlined. The mean (median) initial return for the sample is 7.25 (1.17) percent. The mean (median) gross proceeds raised by these firms is \$26.46 (\$12.8) million. The variable alpha represents the fraction of the firm retained after the IPO by the original entrepreneur(s) and venture capitalists and is measured based

Table I
Sample Summary Statistics

Frequency distribution and characteristics of a sample of 682 initial public offerings (IPOs). The IPOs have a price of at least five dollars and are firm commitment offerings. In addition, all these IPO firms have data available on the COMPUSTAT annual and research tapes for the fiscal year prior to the IPO. The initial return is defined as the difference between the first CRSP-listed after-market price and the offering price as a proportion of the offering price. Alpha is the proportion of the equity of the firm retained by original owners after the IPO. Alpha is computed based on the assumption that the over-allotment options, if any, are not exercised. Size of the issue represents gross proceeds raised at the IPO.

Panel A: Number of Issues Per Year	
Year	Number of Issues
1976	6
1977	1
1978	2
1979	3
1980	30
1981	108
1982	34
1983	245
1984	101
1985	22
1986	63
1987	49
1988	18
Total	682

Panel B: Characteristics of IPO Sample		
Descriptive Measure	Mean	Median
Initial return (%)	7.25	1.17
Offer price (\$)	12.59	12.00
Alpha (%)	71.04	73.12
Size of issue (\$ million)	26.46	12.80

on the assumption that overallocation options, if any, are not exercised. Henceforth, the use of the term "original entrepreneurs" includes venture capitalists. The mean (median) alpha is 71.04 (73.12) percent, suggesting that the original entrepreneurs continue to hold a substantial stake in the firm after the IPO.

We employ two cash flow variables as measures of operating performance. The first measure is operating return on assets, which is operating income (before depreciation and taxes) divided by total assets at the end of the fiscal year (COMPUSTAT data item 13 divided by data item 6). Operating income equals net sales less cost of goods sold and selling, general and administrative expenses before depreciation, depletion, and amortization. Our second operating performance measure is operating cash flows deflated by total assets at the end of the fiscal year. This ratio equals operating income minus capital expenditures (COMPUSTAT data item 13 less data item 128), divided by total assets (COMPUSTAT data item 6).⁶ The operating return on assets provides a measure of the efficiency of asset utilization. Operating cash flows deflated by assets is a useful measure of operating performance since operating cash flows are a primary component in net-present-value (NPV) calculations used to value a firm. We measure the change in operating performance as the median change in levels, i.e., the median value of $\{operating\ return_i(t) - operating\ return_i(-1)\}$, where i represents the firm, -1 represents the fiscal year prior to the IPO, and t represents a post-IPO fiscal year end.⁷ Because operating performance measures may be skewed and the mean is particularly sensitive to outliers, we use the median as a measure of central tendency throughout the article.⁸

⁶ All results are replicated by deflating the two measures of operating performance by net sales (COMPUSTAT data item 12) rather than total assets. The results are qualitatively similar. In an effort to account for the possibility that not all assets are available to generate cash flows for any given year, we also deflate operating income by (i) total assets less capital expenditures, (ii) total assets at the beginning of the year, and (iii) the average of total assets at the beginning and end of the year. In all cases, we find similar results. Finally, since interest income does not appear in operating income but money in the bank does appear in total assets, we add interest income to operating income/operating cash flows and recompute our two performance measures. Although the median levels of the performance measures increase slightly as expected, the decline in operating performance is relatively unchanged. For purposes of brevity, we do not report these numbers, but they are available upon request from the authors.

⁷ By using change in levels we are attempting to measure the improvement in the firm's operating performance during the first few post-IPO years. Typically, investors, when assessing a firm's value, are interested in the improvement in operating performance in addition to levels. Earlier studies by Kaplan (1989), Smith (1990), and Degeorge and Zeckhauser (1993) also use the change in levels to measure operating performance improvement. While the focus of the article is on the change in levels, we also examine the levels of these operating performance measures.

⁸ Earlier studies by Kaplan (1989), Smith (1990), Muscarella and Vetsuypens (1990), and Degeorge and Zeckhauser (1993) also use the median to measure operating performance. For the measures used in this article, we find that only the growth in sales and capital expenditures are highly skewed. We repeat our analysis on the remaining nonskewed operating performance measures using mean levels and find similar results.

We measure the industry-adjusted change in operating performance by matching each IPO firm with firms in the same industry based on three-digit Standard Industrial Classification (SIC) codes. In instances where we do not get at least one three-digit match, we match firms based on two-digit SIC codes.⁹ Hence, the industry-adjusted performance of a firm is the difference between its change in operating performance and the median change in operating performance of all firms in its industry.¹⁰ We also attempt to measure the growth in other accounting measures such as sales (COMPUSTAT data item 12), asset turnover (COMPUSTAT data item 12 divided by data item 6), and capital expenditures (COMPUSTAT data item 128) for IPO firms. The growth in these measures may be able to provide an explanation for the changes in operating performance experienced by IPO firms during the first few years after going public. All reported significance tests are based on the two-tailed Wilcoxon signed rank tests.¹¹ This test, as well as other standard parametric tests, assumes that the observations are independent. There is a possibility that, due to clustering of observations in specific time periods, there is a positive correlation between observations, which would lead to somewhat overstated significance levels. Thus, if dependencies exist, the statistical tests reported in the article provide upper bounds to the true significance levels.

II. Evidence on Operating Performance Changes

A. Operating Performance of IPO Firms

The change in operating performance of issuing firms is measured relative to Year -1 (the fiscal year prior to the IPO). Panel A of Table II presents the median change in operating return on assets both before and after industry adjustment for different time windows. The median changes in operating returns are -3.58 percent, -7.60 percent, -10.53 percent, and -9.09 percent (all significantly different from zero at the 0.01 level) for Years 0, $+1$, $+2$, and $+3$ relative to Year -1 . The industry-adjusted figures show a similar trend of declining operating performance. The median industry-adjusted change in operating returns on assets are -2.91 percent, -6.24

⁹ Our sample of IPO firms are comparable to the industry median firms both on the basis of size and debt ratio. Specifically, for the fiscal year prior to the IPO, the median sales (total assets) are \$21.38 (\$14.68) million and \$24.98 (\$20.61) million for our sample of IPO firms and the industry-matched firms, respectively. In addition, the median total debt to total assets (long-term debt to total assets) ratios for the fiscal year prior to the IPO are 0.274 (0.148) and 0.208 (0.113) for our sample of IPO firms and the industry-matched firms, respectively.

¹⁰ For the fiscal year prior to the IPO, our sample of IPO firms outperform their industry counterparts on the basis of the level of operating return on assets and operating cash flows over assets. For example, the median operating return on assets for the sample of IPO firms is 21.47 percent in comparison to 13.23 percent for the matched industry firms with the difference being significant at the 0.01 level.

¹¹ Since we are in most cases interested in whether one type of firm outperforms the other, using a two-tailed test understates the significance of the results.

percent, -8.12 percent, and -6.81 percent (all significant at the 0.01 level) for Years 0, +1, +2 and +3 relative to Year -1 . Hence, the inferior operating performance of IPO firms cannot be attributed to industry effects.

Reported in Panel B is the median change in operating cash flows deflated by total assets. Again we find evidence of a significant decline in the post-issue operating performance of IPO firms. The operating cash flows deflated by total assets decline by -3.92 percent, -7.92 percent, -7.40 percent, and -6.44 percent (all significant at the 0.01 level) for Years 0, +1, +2, and +3. The industry-adjusted numbers show a similar pattern of significant underperformance for each year subsequent to the IPO with a decline of -4.72 percent (significant at the 0.01 level) over the Year -1 to +3 period.^{12, 13}

Although the results reported in Panels A and B of Table II indicate that the operating performance measures of IPO firms decline relative to their pre-IPO levels, it is not clear that, in the post-issue period, the IPO firms' levels of operating performance measures continue to be higher than those of their industry counterparts. Presented in Figure 1 are the median levels of operating performance measures for the IPO sample and their industry counterparts for Years -1 to +3.¹⁴ In Panel A of Figure 1, the median levels of operating return on assets are illustrated both for the IPO firms and the industry-matched firms. The median levels of operating return on assets for the IPO firms decline over time, while the corresponding levels for their industry counterparts decline by a lesser amount. Further, in each of the four years examined, the IPO firms outperform their industry counterparts, although this difference declines with time. This difference is significant at the 0.01 level until Year +1 and insignificant thereafter. In Panel B of Figure 1, a similar pattern of pronounced decline in operating cash flows deflated by assets for the IPO firms is observed, while their industry counterparts

¹² Another operating cash flow measure we examine is operating income before depreciation minus the change in working capital. This operating cash flow measure is also deflated by total assets. The advantage of this measure is that it eliminates many of the accruals that are at management's discretion. We find the median levels in Year -1 are 16.35 percent and 10.26 percent for IPO firms and the industry-matched firms, respectively. Once again, we find evidence of a significant post-issue decline in performance relative to the pre-IPO level. For instance, the median raw (industry-adjusted) change is -4.19 (-4.18) percent over the period -1 to +3 (both significant at the 0.01 level).

¹³ To assess the impact of potential dependence between observations on our statistical tests, we employ a randomization procedure where one observation is randomly selected each month over the sample period, resulting in a sample of 106 observations. Another approach that we employ is to conduct our tests for each year of the sample period separately as well as over different subperiods. In all these instances, we consistently find operating underperformance by IPO firms subsequent to going public.

¹⁴ While Table II and Figure 1 are related, any attempt to infer the numbers in Figure 1 from those reported in Table II will be incorrect for the following three reasons. First, in Table II we report the median values of the change in levels over different time intervals, while in Figure 1 we illustrate the median levels for each year starting with Year -1 through Year +3 relative to the IPO. We cannot infer the median change in levels from the change in median levels and vice versa. Second, firms keep dropping out of our sample making these calculations all the more invalid. Third, we only need data availability for a particular year if we study levels, but examining changes in levels requires data for that year and Year -1 .

maintain relatively stable levels of performance. IPO firms, however, do not significantly outperform their industry counterparts in any year subsequent to Year -1 . In fact, the industry-matched firms significantly outperform them in Years $+1$ and $+2$. Thus, while IPO firms start out at higher levels of operating performance, they do not continue to outperform their industry counterparts.¹⁵

While it is difficult to pinpoint the exact reason for the inferior operating performance of IPO firms, several possibilities come to mind. Declines in post-issue operating performance can be expected if the IPO firms cannot generate pre-IPO levels of positive NPV projects or if managers fail to maintain the required levels of capital expenditures. Alternatively, positive NPV projects may have negative earnings early, so that operating performance declines while investment is occurring.¹⁶ To examine this issue, we study the growth in sales, asset turnover, and capital expenditures for IPO firms to determine if they can explain the underperformance documented in this study. In Panel C of Table II, the median percentage change in sales growth is reported for Years 0, $+1$, $+2$ and $+3$ relative to Year -1 , both before and after industry adjustment. The median increases in sales measured relative to Year -1 are 37.22 percent, 69.92 percent, 108.09 percent, and 143.15 percent for Years 0, $+1$, $+2$, and $+3$, respectively. The industry-adjusted figures show a similar, although less pronounced, pattern with the sales of IPO firms increasing by 80.67 percent more than their industry counterparts over the four years after going public. The results suggest that the increase in sales for IPO firms cannot be attributed exclusively to industry trends.

In Panel D of Table II, the median percentage change in asset turnover is reported. The median percentage change in asset turnover decreases by 23.44 percent over a four-year window from -1 to $+3$, while over a similar period the industry-adjusted decline in asset turnover is 19.98 percent (both signifi-

¹⁵ The significance test results of the difference in the median levels of our operating performance measures for the IPO firms and their industry counterparts are not reported in the article but are available from the authors.

¹⁶ We extend our analysis to cover Years $+4$ and $+5$ to address the possibility that the inferior performance of IPO firms may eventually end and that our results are due to an insufficient time window for the full impact of the benefits of investing in new projects to show up in accounting numbers. Although extending the analysis beyond three years could induce a significant survivorship bias, this only becomes an issue if the performance improves. We find evidence of continued significant underperformance in Years $+4$ and $+5$ relative to Year -1 . For instance, the raw (industry-adjusted) operating return on assets for Years $+4$ and $+5$ are -10.12 (-7.83) percent and -10.49 (-7.83) percent respectively (all significant at the 0.01 level). Similarly, the raw (industry-adjusted) operating cash flows deflated by total assets in years $+4$ and $+5$ are -7.18 (-6.23) percent and -6.73 (-6.11) percent respectively (all significant at the 0.01 level). We also examine year-by-year performance changes, post-issue, -1 to 0, 0 to $+1$, $+1$ to $+2$, and so on. While the year-by-year decline seems to slow down with time, we find no evidence of a turnaround in performance as measured by changes in performance over Years $+2$ to $+3$, $+3$ to $+4$, or even $+4$ to $+5$. Our finding that operating performance remains far below pre-IPO levels after as many as five years subsequent to going public is contrary to the argument that operating margins decline while the investment is occurring and turnaround subsequently.

Table II
Operating Performance of Initial Public Offering Firms

Table values are for the median change/growth expressed as a percentage for 682 initial public offering (IPO) firms during the period 1976 through 1988. The IPOs have a price of at least five dollars and are firm commitment offerings. In addition, all these IPO firms have data available on the COMPUSTAT annual and research tapes for the fiscal year prior to the IPO. Operating return on assets equals operating income before depreciation as a percentage of total assets measured at the end of the fiscal year. Operating cash flows are defined as operating income less capital expenditures. Sales growth equals the growth in net sales. Asset turnover equals net sales over total assets. The industry-adjusted change/growth for a given firm is the deviation from the contemporaneous industry median. Year - 1 is the fiscal year preceding the year during which the firm goes public. The significance tests are based on the Wilcoxon signed rank test, which assumes that the observations are independent.

Measure of Operating Performance	Year Relative to Completion of IPO			
	From - 1 to 0	From - 1 to + 1	From - 1 to + 2	From - 1 to + 3
Panel A: Operating Return on Assets				
Median level in Year - 1 (%):				
IPO issuing firms = 21.41				
Matched industry firms = 13.23				
Median change (%)	- 3.58***	- 7.60***	- 10.53***	- 9.09***
Median industry-adjusted change (%)	- 2.91***	- 6.24***	- 8.12***	- 6.81***
Number of observations	667	637	593	550
Panel B: Operating Cash Flows/Total Assets				
Median level in Year - 1 (%):				
IPO issuing firms = 11.26				
Matched industry firms = 4.85				
Median change (%)	- 3.92***	- 7.92***	- 7.40***	- 6.44**
Median industry-adjusted change (%)	- 2.99***	- 6.67***	- 5.79***	- 4.72***
Number of observations	647	619	575	532
Panel C: Sales				
Median level in Year - 1 (M\$):				
IPO issuing firms = 21.38				
Matched industry firms = 24.98				
Median percentage change (%)	37.22***	69.92***	108.09***	143.15**
Median industry-adjusted percentage change (%)	19.80***	38.70***	60.97***	80.67***
Number of observations	673	647	603	561
Panel D: Asset Turnover				
Median level in Year - 1:				
IPO issuing firms = 1.50				
Matched industry firms = 1.24				
Median percentage change (%)	- 20.25***	- 22.33***	- 26.58***	- 23.44***
Median industry-adjusted percentage change (%)	- 20.25***	- 21.77***	- 21.88***	- 19.98***
Number of observations	674	646	602	560

Table II—*Continued*

Panel E: Capital Expenditures				
Measure of Operating Performance	Year Relative to Completion of IPO			
	From – 1 to 0	From – 1 to + 1	From – 1 to + 2	From – 1 to + 3
Median level in Year – 1 (M\$):				
IPO issuing firms = 1.22				
Matched industry firms = 1.33				
Median percentage change (%)	90.45***	141.61***	144.66***	167.33***
Median industry-adjusted percentage change (%)	75.52***	109.09***	107.13***	111.00***
Number of observations	654	628	583	540

*** Significant at 1 percent.

** Significant at 5 percent.

cant at the 0.01 level). Despite the high sales growth, the decline in asset turnover is indicative of the fact that IPO firms increase their assets faster than their sales. In Panel E, the growth in capital expenditures is provided and the results suggest a significant increase over all time windows. For instance, the median percentage change in capital expenditures is 167.33 percent (significant at the 0.01 level) for Year + 3 relative to Year – 1. Even after adjustment for industry effects, IPO firms have substantially higher growth in capital expenditures in comparison to similar firms.

In summary, we find evidence that IPO firms exhibit inferior post-IPO operating performance relative to the year prior to going public. This occurs despite a pattern of high growth in sales and capital expenditures over the time period studied. The decline in operating performance of IPO firms is consistent with: (1) ownership structure changes resulting in increased agency costs and a tendency for the entrepreneur(s) to overinvest; (2) managers attempting to window-dress by overstating pre-IPO performance; and (3) managers timing their issues to coincide with periods of unusually good performance. We discuss some of these issues further in Section III.

B. Management Ownership and Operating Performance

Both the agency theory hypothesis (Jensen and Meckling (1976)) and the signaling hypothesis (Leland and Pyle (1977)) lead us to expect relatively superior operating performance from firms with higher ownership retained by entrepreneurs in comparison to firms with lower ownership retained. To test this conjecture, we examine the relation between our operating performance measures and the fraction of the firm retained by the pre-issue shareholders (alpha) after the IPO. We split the sample into two groups based on the median alpha. Henceforth, the above median alpha subsample will be

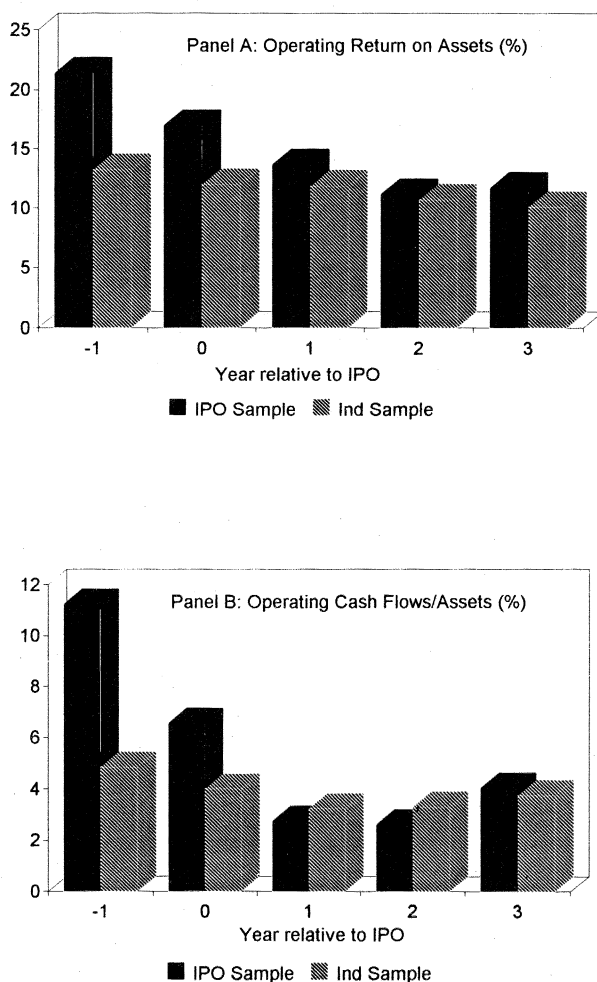


Figure 1. Operating performance measures. The median levels of operating return on assets and operating cash flows over assets for 682 IPO firms from 1976 to 1988 and their industry counterparts for fiscal Years -1 to +3 relative to the IPO are illustrated. Operating return on assets is defined as operating income (before depreciation and taxes) divided by total assets measured at the end of the fiscal year. Operating cash flows over total assets is defined as operating income less capital expenditure divided by total assets measured at end of the fiscal year. The *solid bars* represent IPO firms, while the *shaded bars* represent the industry-matched firms. The numbers graphed above are related to those reported in Panels A and B of Table II.

referred to as the high-ownership group and the below median alpha subsample as the low-ownership group.

In Table III, the high- and low-management-ownership groups are compared using several variables observable prior to the IPO. The high- (low)-management-ownership group's median offer price is \$12.50 (\$11.00) and the median gross proceeds is \$14.30 (\$11.40) million. While the median operating return on assets prior to the IPO is not significantly different for the two

Table III

**Summary Statistics of 682 IPO Firms Split By Median
Proportion of the Firm Retained after the IPO (Alpha)**

The initial public offerings (IPOs) have a price of at least five dollars and are firm commitment offerings. In addition, all these IPO firms have data available on the COMPUSTAT annual and research tapes for the fiscal year prior to the IPO. The initial return is defined as the difference in the first after-market price and the offering price as a proportion of the offering price. Alpha is the fraction of the firm retained by the original owners and is computed on the assumption that overallotment options, if any, are not exercised. Operating return on assets equals operating income before depreciation as a percentage of total assets measured at the end of the fiscal year. Operating cash flows are defined as operating income less capital expenditures. Year - 1 is the fiscal year preceding the year during which the firm goes public. The test for differences between the two groups is performed using the Wilcoxon two-sample signed rank test, which assumes that the observations are independent. Number of observations is in parentheses in the ownership columns.

Variable	High Ownership (Alpha $\geq$ 73.12%)	Low Ownership (Alpha < 73.12%)	Wilcoxon Two- Sample Test Z-Statistic (<i>p</i> -Value)
Median size of issue (\$ million)	14.30 (341)	11.40 (341)	2.73*** (0.006)
Median offer price (\$)	12.50 (341)	11.00 (341)	2.74*** (0.006)
Median initial return (%)	0.54 (340)	1.47 (339)	-0.96 (0.334)
Median alpha (%)	81.05 (341)	65.18 (341)	22.59*** (0.000)
Median operating return on assets (Year - 1) (%)	20.92 (338)	22.21 (335)	-1.41 (0.157)
Median capital expenditures over total assets (Year - 1) (%)	9.28 (341)	8.05 (341)	2.20** (0.028)
Median operating cash flows over total assets (Year - 1) (%)	9.81 (331)	12.21 (329)	-1.88* (0.060)

*** Significant at 1 percent.

** Significant at 5 percent.

* Significant at 10 percent.

groups, the low-management-ownership group has significantly higher median operating cash flows over total assets and significantly lower capital expenditures deflated by total assets.

The change in operating performance for the post-IPO period for the two groups, both before and after industry adjustment, is reported in Table IV. Panel A shows that, while the operating returns on assets for both high- and low-ownership groups decline, the high-ownership group shows superior operating performance relative to the low-ownership group for each of the four years relative to Year - 1, with the difference being significant for most time periods considered both before and after industry adjustment. For instance, the high-ownership group shows a median raw (industry-adjusted) change of -2.76 (-1.81) percent in operating return on assets in comparison to a median raw (industry-adjusted) change of -4.55 (-4.29) percent for the low-ownership group from Year - 1 to Year 0, with the difference being significant at the 0.01 level. A similar pattern is evident for Year + 1 relative to Year - 1. For Years + 2 and + 3 relative to Year - 1, the raw (industry-

Table IV—Continued

Measure of Operating Performance	Years Relative to Completion of IPO							
	- 1 to 0		- 1 to + 1		- 1 to + 2		- 1 to + 3	
	Alpha ≥ 73.12%	Alpha < 73.12%	Alpha ≥ 73.12%	Alpha < 73.12%	Alpha ≥ 73.12%	Alpha < 73.12%	Alpha ≥ 73.12%	Alpha < 73.12%
Panel C: Sales								
Median percentage change (%)	46.24***	30.36***	84.08***	59.15***	117.67***	89.73***	161.07***	129.81***
Median industry-adjusted percentage change (%)	26.83***	14.69***	51.76***	27.53***	76.15***	48.65***	101.90***	68.89***
Number of observations	337	336	322	325	301	302	283	278
Panel D: Asset Turnover								
Median percentage change (%)	- 19.34***	- 21.22***	- 22.20***	- 22.33***	- 24.62***	- 28.79***	- 22.49***	- 24.21***
Median industry-adjusted percentage change (%)	- 19.75***	- 20.64***	- 21.30***	- 22.65***	- 20.72***	- 23.91***	- 18.27***	- 21.56***
Number of observations	339	335	322	324	301	301	283	277
Panel E: Capital Expenditures								
Median percentage change (%)	94.37***	88.73***	150.22***	136.25***	160.26***	130.09***	185.30***	142.45***
Median industry-adjusted percentage change (%)	79.38***	71.39***	114.3***	99.37***	124.62***	85.90***	122.43***	96.86***
Number of observations	331	323	314	314	292	291	275	265

*** Significant at 1 percent.
** Significant at 5 percent.
* Significant at 10 percent.

adjusted) operating returns on assets for the high-ownership group continue to be higher than for the low-ownership group, although the difference is by and large insignificant.

In Panel B of Table IV, we compare the operating cash flows deflated by assets for the high- and low-ownership groups. The median change in operating cash flows deflated by assets is slightly higher for the high-ownership group for Year 0 relative to Year -1 ; though the difference is not significant. For the remaining years, however, both before and after industry adjustment, the high-ownership group has significantly less deterioration in operating cash flows in comparison to the low-ownership group. For instance, the median change in operating cash flows deflated by assets for the high-ownership group is -4.95 percent for Year $+3$ relative to Year -1 in comparison to -7.69 percent for the low-ownership group over the same period, with the difference being statistically significant. The industry-adjusted numbers lead to similar conclusions.¹⁷

We also compare the increase in sales, asset turnover, and capital expenditures for the high- and low-ownership groups in Panels C, D, and E of Table IV. The high-management-ownership group displays significantly higher sales growth both before and after industry adjustment. However, the difference in asset turnover or capital expenditure growth between the two groups is insignificant. Thus, there is no evidence to suggest that the relatively superior operating performance of the high-management-ownership group is the result of cutbacks in capital expenditures.

Our results of relatively superior post-IPO operating performance of firms with high-ownership retention by entrepreneurs are consistent with the implications of agency and signaling models. They are also consistent with Ritter's (1984) wealth effect hypothesis, which assumes that to raise a given amount of money the proportion of stock sold by initial owners decreases with higher firm value. As Ritter (1984) points out, however, a wealth effect of the opposite kind may occur if high-value-firm owners choose to sell larger amounts of stock for investment or diversification purposes.

C. Operating Performance and Underpricing

Several recent articles posit that IPO firms signal their quality to the market by underpricing their stock. Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) all model the IPO process assuming information asymmetry between issuers and investors. These models suggest that high-quality issuers sell a small fraction of the firm at the IPO and

¹⁷ In results not reported in this article, the differences in performance using these two cash flow-related measures, both before and after industry adjustment, are significantly higher for the high-ownership group relative to the low-ownership group for Years $+4$ and $+5$ relative to Year -1 . For instance, the median change in operating return on assets (industry-adjusted) for Year $+5$ relative to Year -1 is -8.27 (-5.10) percent and -12.26 (-9.15) percent for the high- and low-ownership groups, respectively, with the difference being significant at the 0.01 level. We obtain similar results based on the median change in operating cash flows over total assets.

underprice their stock. Subsequently, a second equity issue and/or insider sale is undertaken through a seasoned offering when market prices are established and the information asymmetry is resolved or minimized. Low-value firms that try to take advantage of the information asymmetry and dress themselves to look like high-value firms incur the cost of underpricing. Further, there is a positive probability that the true quality of the low-value firm will be revealed in between the two offerings. When the probability of type revelation is high enough (but not too high), the low-value firms find it optimal not to underprice and to voluntarily reveal their type by selling at their true value. In the resulting separating equilibrium, only high-value firms underprice at the IPO. Thus, if subsequent operating performance proxies for unobservable firm quality at the time of the IPO, the signaling models of underpricing predict that IPO firms that underprice should exhibit superior operating performance in comparison to those that do not. We test this conjecture by examining the relation between IPO underpricing and post-IPO operating performance.

In Table V, the IPO sample is split into two subsamples based on the median underpricing. A comparison of the two subsamples on several variables measured at or prior to the IPO is shown. The results suggest that there are no significant differences between the two groups with regard to management ownership retention at the IPO, median operating return on assets, median operating cash flows deflated by total assets, or the median level of capital expenditures over assets, all measured in the year prior to the IPO. Thus, except for differences in the price of the IPO, the two groups are indistinguishable based on information observable prior to the IPO.

In Table VI, a comparison of operating performance for the two groups is provided for different time windows both before and after industry adjustment. Panel A shows that the difference in operating returns on assets for the two groups either before or after industry adjustment is insignificant. For instance, the operating returns on assets for the above median group declines by -9.57 percent from Year -1 to Year $+3$ in comparison to a decline of -8.74 percent for the below-median group over the same period. The difference, however, is insignificant both before and after industry adjustment. Similarly, Panel B shows that there is no difference in the median change in operating cash flows deflated by assets for the above- or below-median underpricing group for any of the time windows under consideration both before and after industry adjustment. The above results suggest that underpricing has insignificant explanatory power in predicting post-IPO operating performance.¹⁸

Panel C of Table VI suggests that IPO firms underpriced above the median level experience a significantly higher increase in sales both before and after

¹⁸ Extending the analysis to include Years $+4$ and $+5$ relative to Year -1 does not change the conclusion.

Table V
Summary Statistics of 682 IPO Firms Split By Median Underpricing

The initial public offerings (IPOs) have a price of at least five dollars and are firm commitment offerings. In addition, all these IPO firms have data available on the COMPUSTAT annual and research tapes for the year prior to the IPO. Underpricing is defined as the difference in the first after-market price and the offering price as a proportion of the offering price. Alpha is the fraction of the firm retained by original owners after the IPO and is computed under the assumption that overallocation options, if any, are not exercised. Operating return on assets equals operating income before depreciation as a percentage of total assets measured at the end of the fiscal year. Operating cash flows are defined as operating income less capital expenditures. Year - 1 is the fiscal year preceding the year during which the firm goes public. The Wilcoxon two-sample signed rank statistic tests the null hypothesis of no difference in medians between the low- and high-underpricing groups against the alternative hypothesis that there is a difference in medians between the two groups. This test assumes that the observations are independent. Number of observations is given in parentheses in the underpricing columns.

Variable	Underpricing ≤ 1.17%	Underpricing > 1.17%	Wilcoxon Two-Sample Test Z-Statistic (p-Value)
Median size of issues (\$ million)	12.60 (343)	13.20 (339)	-0.9455 (0.344)
Median offer price (\$)	11.00 (343)	12.75 (339)	-3.30*** (0.001)
Median underpricing (%)	0.00 (340)	10.00 (339)	-22.69*** (0.000)
Median alpha (%)	73.80 (343)	72.60 (339)	1.44 (0.148)
Median operating return on assets (Year - 1) (%)	21.03 (337)	21.79 (336)	-0.18 (0.854)
Median capital expenditures over total assets (Year - 1) (%)	8.20 (343)	8.79 (339)	-1.44 (0.150)
Median operating cash flows over total assets (Year - 1) (%)	11.28 (327)	11.14 (333)	0.69 (0.485)

*** Significant at 1 percent.

industry adjustment over all time periods studied, in comparison to the below median group. Panel D indicates that the decline in asset turnover is higher for issues underpriced above the median, but this difference is significant only in the first two years subsequent to the IPO. Similarly, Panel E suggests that the above-median underpricing group has significantly higher growth in capital expenditures but that the difference is not significant after industry adjustment for most of the time period studied. Thus, we find no clear evidence to indicate significant differences between the two groups in terms of asset turnover or capital expenditure growth rates. The above- and below-median underpricing groups are indistinguishable prior to the IPO based on observable performance measures and continue to be indistinguishable on these measures after the IPO.

One possible explanation for the insignificant results obtained from testing the signaling impact of underpricing is that the signaling effect of managerial ownership may mask the results. It is possible that, after controlling for managerial ownership, underpricing is a relevant signal. To test this conjec-

ture, we estimate cross-sectional regressions of the following form:

$$PERF_{it} = \beta_0 + \beta_1 DALPHA_i + \beta_2 DUNDPR_i + e_i$$

where $PERF_{it}$ is the performance change of firm i based either on the operating return on assets or operating cash flows over assets for year t relative to the fiscal year prior to the IPO. $DALPHA$ is a dummy variable that takes the value 1 if managers retain more than the median ownership retention level (73.12 percent) after the IPO and 0 otherwise. Similarly, $DUNDPR$ is a dummy variable that takes the value 1 if underpricing exceeds the median underpricing level (1.17 percent) and 0 otherwise. The regressions are estimated both with raw operating performance measures and industry-adjusted numbers. Regressions employing the change in performance measured from Years 0, +1, +2 +3, +4, +5, the averages of Years +1 to +3, and the average of Years +1 to +5, relative to Year -1, are estimated.¹⁹ Our cross-sectional regression analysis confirms our earlier findings that, while managerial ownership retention is generally positively related to post-IPO operating performance, underpricing has insignificant explanatory power. For purposes of brevity, these results are not reported in the article.

We also estimate these cross-sectional regressions with continuous independent variables instead of dummy variables and find that the coefficient associated with underpricing is consistently negative and insignificant in all regressions, using either measure of operating performance. For alpha, the results depend on the specific operating performance measure. For instance, with operating return on assets as the dependent variable, the coefficient associated with alpha is consistently positive but insignificant. However, with operating cash flows deflated by assets as the dependent variable, the coefficient associated with alpha is positive and generally significant.²⁰

Overall, we find no relation between operating performance and underpricing. Since we are testing the joint hypothesis that underpricing is a signal of quality and that the performance measures used in this study are good proxies for firm quality, rejection of the hypothesis does not necessarily provide evidence against the signaling model. Earlier studies have also found

¹⁹ For firms that are delisted before Year +5, the average is computed based on the number of years data is available on COMPUSTAT. For example, if a firm is delisted in Year +3, then the average is based on Years -1 to +3.

²⁰ The lack of a significant positive coefficient on alpha in some regressions when continuous independent variables are used could be due to the absence of a linear relation between ownership retention and performance. Another possibility could be that issuers may face different levels of the agency problems due to, for example, technological differences. As a result, firms with large potential agency problems would, *ceteris paribus*, have higher ownership retention ratios since they have relatively high marginal costs of lowering alpha. Thus, even though for a given firm a lower value of alpha will lead to a greater deterioration in operating performance, the failure to control for other factors affecting the extent of the agency problems may mask the predicted relation between alpha and operating performance. We also estimate cross-sectional regressions after controlling for the IPO offer size, which is found to be significantly positively related to operating performance. The results with alpha and underpricing, after controlling for the size of the issue, are essentially similar to those discussed in the article.

Table VI—Continued

Measure of Operating Performance	Years Relative to Completion of IPO							
	- 1 to 0		- 1 to + 1		- 1 to + 2		- 1 to + 3	
	Under-pricing ≤ 1.17%	Under-pricing > 1.17%	Under-pricing ≤ 1.17%	Under-pricing > 1.17%	Under-pricing ≤ 1.17%	Under-pricing > 1.17%	Under-pricing ≤ 1.17%	Under-pricing > 1.17%
	Z-Statistic (p-Value)	Z-Statistic (p-Value)	Z-Statistic (p-Value)	Z-Statistic (p-Value)	Z-Statistic (p-Value)	Z-Statistic (p-Value)	Z-Statistic (p-Value)	Z-Statistic (p-Value)
Panel C: Sales								
Median percentage change (%)	30.87***	44.20***	-4.59*** (0.001)	85.7***	-4.48*** (0.001)	86.30***	122.73***	-3.74*** (0.002)
Median industry-adjusted percentage change (%)	16.23***	26.73***	-4.00*** (0.001)	51.89***	-3.64*** (0.003)	45.98***	68.89***	-3.29*** (0.001)
Number of observations	335	338		320	327	292	311	271
								290
Panel D: Asset Turnover								
Median percentage change (%)	-17.19***	-24.77***	+3.92*** (0.000)	-21.29***	-24.32*** (0.100)	-25.55***	-26.90***	+0.68 (0.498)
Median industry-adjusted percentage change (%)	-16.02***	-24.33***	+3.55*** (0.000)	-19.40***	-22.88*** (0.068)	-21.32***	-24.17***	+1.01 (0.312)
Number of observations	336	338		319	327	291	311	270
								290
Panel E: Capital Expenditures								
Median percentage change (%)	86.37***	96.50***	-1.57 (0.114)	123.61***	173.45***	-3.35*** (0.008)	129.06***	181.81***
Median industry-adjusted percentage change (%)	75.43***	75.98***	-1.42 (0.155)	88.30***	122.93*** (0.015)	-2.42*** (0.015)	89.46***	127.54***
Number of observations	319	335		303	325	275	308	254
								286

*** Significant at 1 percent.
** Significant at 5 percent.
* Significant at 10 percent.

little or no support for the signaling models. For instance, Michaely and Shaw (1994) find no relation between underpricing and long-run investment performance. Jegadeesh, Weinstein, and Welch (1993) and Garfinkel (1993) test the relation between underpricing and subsequent seasoned issues. They do not find any clear evidence to support the signaling models of underpricing.

III. Market Expectations and Earnings Performance

The post-IPO declines in operating performance measures documented in this study are consistent with Degeorge and Zeckhauser (1993), who document similar results for a sample of reverse-LBO firms. Since debt overhang and low levels of information asymmetry are characteristics largely specific to reverse-LBO firms, our results suggest that these factors do not drive the inferior operating performance of younger IPO firms. A partial explanation for the decline in post-IPO performance documented in this study is that it is a manifestation of the change in the incentive structure resulting from reduced managerial ownership in the post-IPO firm. Other explanations, consistent with the change in incentive structure, for the decline in operating performance are managers attempting to window-dress by overstating pre-IPO performance levels and/or entrepreneurs timing the offerings to coincide with periods of unusually good performance that they know cannot be sustained in the future. Successful timing or window-dressing actions taken by issuers may result in potential investors having high, and systematically biased, expectations of earnings growth in the post-issue period.

We examine several measures of investor expectations of post-IPO earnings growth and the actual post-issue earnings performance to determine if investors expect continued earnings growth in the post-issue period and if these expectations are fulfilled. Specifically, to study investor expectations of earnings potential, we examine the post-issue M/B and P/E ratios for both IPO firms and their industry counterparts. We use two definitions of the M/B ratio. In the first definition, the M/B ratio is defined as the ratio of market value of equity plus debt divided by the book value of equity plus debt (COMPUSTAT data item 24 $\times$ data item 25 + data item 9 + data item 34) divided by (data item 60 + data item 9 + data item 34). We assume that the market value of debt is equal to its book value. In the second definition, we report the M/B ratio of equity, defined as the ratio of market value of equity to the book value of equity (COMPUSTAT data item 24 $\times$ data item 25) divided by data item 60). The P/E ratio is computed as COMPUSTAT data item 24 divided by data item 58. To measure the post-issue earnings performance of IPO firms and their industry counterparts, we also examine earnings per share (EPS) (COMPUSTAT data item 58 divided by data item 27).²¹

²¹ To compute EPS, we divide COMPUSTAT data item 58 (EPS excluding extraordinary items) by COMPUSTAT data item 27 (adjustment factor). This adjustment factor represents a ratio that enables the user to adjust per-share data (prices, EPS, dividends per share) for all stock splits and stock dividends. These adjustment factors applied to data for previous years places such data on the same terms as current share units.

As IPO firms are not publicly traded at the end of fiscal Year -1 , we do not have the necessary price information to compute most of these ratios for Year -1 . Hence, all the changes in these ratios are reported relative to Year 0. We do, however, compute the approximate P/E ratio for the IPO firms for Year -1 using the offering price and the EPS for fiscal Year -1 . The median P/E ratio for Year -1 for the IPO firms is 23.33, while it is 16.72 for the industry-matched firms (difference significant at the 0.01 level). Given that these firms are sold at higher multiples (P/E) at the IPO (23.33), computing the changes relative to Year 0 (14.10) underestimates the actual decline following the IPO.

Median raw and industry-adjusted changes in levels of these ratios in Years $+1$ to $+5$ relative to Year 0 are reported in Table VII. The results in Panels A and B suggest that there is generally a significant decline in both measures of the M/B ratio for each post-issue year relative to Year 0 both before and after industry adjustment. Similarly, the results in Panel C suggest that the median raw and industry-adjusted P/E ratios of IPO firms decline significantly in each post-issue year relative to Year 0. Panel D provides evidence of the changes in earnings performance during the post-issue period relative to Year 0. It can be seen that the median raw and industry-adjusted EPS of IPO firms decline significantly in each year relative to Year 0. The decline in median P/E and EPS ratios implies that the median price is falling in the post-issue period. These results are consistent with Ritter (1991) who documents a median three-year investment return of -16.70 percent measured from the first aftermarket closing price.

In addition to changes in the levels of these ratios, we also examine the year-by-year levels for both IPO firms and their industry counterparts in Figure 2. From Panels A and B, it can be seen that in Year 0 IPO firms start out with high M/B ratios relative to their industry counterparts. However, the M/B ratios decline considerably over time for the IPO firms, while the decline for their industry counterparts is modest at best. In Panel C, the median levels of P/E ratios of IPO firms decline over time and are typically lower than their industry counterparts. In Panel D, the median levels of EPS in each year suggest that while IPO firms experience a decline in EPS over time, the industry-matched firms demonstrate a relatively stable pattern. Thus, the overall results suggest that IPO firms start out with high M/B and P/E ratios, which decline significantly over time. The decline in these ratios cannot be attributed solely to industry effects. Further, the EPS ratios of IPO firms also decline significantly over time.²² Overall, these results suggest that investors appear to value firms going public based on expectations that

²² To test the robustness of our results, we repeat the entire analysis in this section using a larger sample of 1353 IPOs. The increased sample is obtained by relaxing the restriction that IPO firms must have Year -1 data on COMPUSTAT. The results with the increased sample are qualitatively similar to those reported for the smaller sample of 682 IPOs. For instance, the median levels for Year 0 (Year $+5$) of the M/B ratio, M/B of equity ratio, P/E ratio, and EPS are 2.24 (1.32), 2.68 (1.43), 13.55 (10.69), and 0.438 (0.230), respectively. As is clearly evident, all the levels exhibit significant declines.

Table VII
Market Expectations and Earnings Performance of 682 Initial Public Offering Firms

Table values are for the median change for 682 IPO firms during the period 1976 through 1988. The IPOs have a price of at least five dollars and are firm commitment offerings. In addition, all these IPO firms have data available on the Compustat Annual and Research Tapes for the year prior to the IPO. The market-to-book (M/B) ratio of assets equals the ratio of market value of equity plus debt divided by book value of equity plus debt. The M/B ratio of equity is defined as the ratio of market value of equity to the book value of equity. The industry-adjusted change for a given firm is the deviation from the contemporaneous industry median. Year 0 is the first fiscal year after the IPO. The significance tests are based on the Wilcoxon signed rank, which assumes that the observations are independent.

Description	Year 0 to + 1	Year 0 to + 2	Year 0 to + 3	Year 0 to + 4	Year 0 to + 5
Panel A: M/B Ratio of Assets					
Median level in Year 0: IPO firms = 2.23					
Industry-matched firms = 1.60					
Median change	-0.346***	-0.436***	-0.689***	-0.911***	-1.013***
Median industry-adjusted change	-0.224***	-0.428***	-0.555***	-0.670***	-0.791***
Number of observations	637	594	552	507	443
Panel B: M/B Ratio of Equity					
Median level in Year 0: IPO firms = 2.61					
Industry-matched firms = 2.02					
Median change	-0.468***	-0.560***	-0.904***	-1.202***	-1.279***
Median industry-adjusted change	-0.284	-0.573***	-0.759***	-0.916***	-1.027***
Number of observations	639	595	553	508	444

Table VII—Continued

Description	Panel C: Price-Earnings Ratio (P/E)				
	Year 0 to +1	Year 0 to +2	Year 0 to +3	Year 0 to +4	Year 0 to +5
Median level in Year 0: IPO firms = 14.10 Industry-matched firms = 15.61					
Median change	-0.881***	-0.365***	-1.741***	-4.431***	-5.419***
Median industry-adjusted change	-0.237	-2.330***	-2.924***	-4.121***	-6.426***
Number of observations	625	580	538	495	438
	Panel D: Earnings Per Share (EPS)				
Median level in Year 0: IPO firms = 0.450 Industry-matched firms = 0.441					
Median change	0.015**	-0.040***	-0.050***	-0.037***	-0.113***
Median industry-adjusted change	-0.017***	-0.038***	-0.075***	-0.076***	-0.093***
Number of observations	629	588	549	503	447

*** Significant at 1 percent.

** Significant at 5 percent.

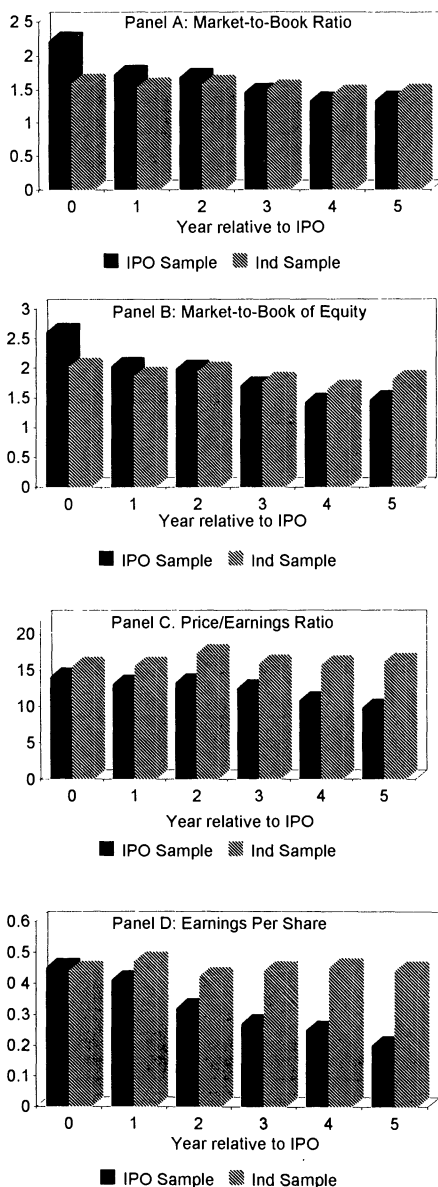


Figure 2. Market expectations and earnings performance. The figure illustrates the median levels of market-to-book (M/B) ratio of assets, M/B ratio of equity, price-earnings (P/E) ratio, and earnings-per share (EPS) for fiscal Years 0 to +5 relative to the IPO. M/B ratio of assets is defined as the ratio of the market value of equity plus debt divided by the book value of equity plus debt. We assume that the market value of debt is equal to its book value. The M/B ratio of equity is defined as the ratio of market value of equity to the book value of equity. The P/E ratio is computed as the price divided by EPS. The EPS numbers have been adjusted to account for all stock splits and stock dividends. The *solid bars* represent IPO firms, while the *shaded bars* represent the industry-matched firms. The numbers graphed above are related to those reported in Table VII.

earnings growth will continue, while in actuality the pre-IPO earnings levels on which expectations are formed are not even sustained.

Further evidence consistent with investors having overly optimistic expectations based on pre-IPO performance levels is provided by Ritter (1991) and Loughran and Ritter (1995). They document long-run investment underperformance, which, in conjunction with the long-run operating performance decline, seems to indicate that investors not only do not fully anticipate but are continually surprised by the post-IPO declines in operating performance. Ritter (1991) suggests that risk mismeasurement is a possible, although unlikely, alternative explanation for his investment underperformance results. Ibbotson (1975), Chan and Lakonishok (1992), and Clarkson and Thompson (1990) all document that average betas decline with the length of time following the IPO. It is hard to argue, however, that risk mismeasurement can explain long-run investment underperformance of IPOs in light of Loughran and Ritter's (1995) findings that IPOs earn, on average, nominal returns of just five percent per year over the five-year period subsequent to going public.

IV. Conclusions

We find that firms going public exhibit a substantial decline in post-issue operating performance. Over a six-year period extending from the year prior to the IPO until five years after the offering, the performance of IPO firms declines significantly relative to their pre-IPO levels, based on several performance measures. Further, we present evidence to support the contention that high pre-IPO operating performance levels may lead investors to develop optimistic assessments of earnings growth for the IPO firms. Despite an increase in sales and capital expenditures, however, the pre-IPO performance levels are not sustained, leading to a decline in expectations.

We provide evidence suggesting a positive relation between managerial ownership retention and post-IPO operating performance. It is not possible, however, to determine whether the relatively superior operating performance occurs as a result of lower agency conflicts when there is higher ownership retention, as a result of entrepreneurs signaling quality with ownership retention, or for other reasons. We find no evidence to show that firms that underprice more provide superior operating performance after the IPO. Thus, either underpricing is not a signal of quality as proxied by the operating performance measures employed in this study, or other proxies for quality may provide better support for the signaling conjecture.

Overall, our results indicate that IPO firms are unable to sustain their pre-issue performance levels. Although IPO firms display high post-issue growth in sales and capital expenditures, their measures of profitability decline. Earlier studies have documented low stock returns for issuing firms for several years subsequent to going public; our results are consistent with these studies. It appears that IPO firms are priced with the expectation that

profit margins will grow beyond their pre-IPO levels, while in reality they decline over time.

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