The Role Of Exchange Listing In The Initial And Aftermarket Performance Of IPOs

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This article examines the role of the exchange listing on the initial and aftermarket performance of Initial Public Offerings (IPOs). IPOs on the NASDAQ had larger initial and aftermarket returns when compared to IPOs on the NYSE. These results suggest that it may be important for individual investors purchasing IPOs to consider the exchange on which the firm is listing. The results also suggest that the choice of exchange listing may affect the proceeds the issuing firm receives from the offering and should be taken into consideration by firms contemplating an IPO.

Key words: *Stocks, Initial public offering, Stock exchanges, Investments*

Introduction

Investors are exposed to a great deal of information about the returns on initial public offerings (IPOs) of common equity. Articles in professional journals and newspapers have cited many examples of large returns earned by investors in IPOs. In addition, academic research has documented significant excess returns on IPOs when purchased at the offering price. In reality, individual investors are rarely afforded an opportunity to invest in IPOs at the offer price and are instead forced to purchase shares at inflated aftermarket prices. Previous research has shown that IPOs, on average, significantly underperform the market in the long-term if purchased at the end of the first day of trading. The patterns in IPO pricing suggest that individual investors may be net losers when purchasing IPOs at aftermarket prices.

In order to avoid the potential underperformance of IPOs and still participate in this market segment, individual investors are in need of a simple selection criterion that will increase their probability of earning positive excess returns when investing in IPOs. A summary measure that may affect returns on IPOs is the exchange listing of the security. Affleck-Graves, Hegde, Miller, and Reilly (1993) advanced a trading system certification proposition which posits that the initial and continued listing standards imposed by a trading system provide investors with reliable information about the quality of new issues, reduce uncertainty about their prospects, and thereby lower the expected underpricing of IPOs. For the period 1983 to 1987, the authors found a mean first-day raw return for a sample of 55 NYSE listed IPOs of 4.82% and a mean raw return of 5.56% for a sample of 158 NASDAQ National Market System firms. The results are consistent with the hypothesis that market listing can affect IPO returns in the short term.

The purpose of this article was to examine the role of exchange listing in both the initial and aftermarket performance of IPOs. The results of the study have implications for individual investors; if returns are different across markets, individual investors can use market listing as a mechanism to avoid the poor aftermarket performance of the average IPO. This study extends Affleck-Graves et al. (1993) in two important ways. First, the study examined the aftermarket performance of IPOs up to one year after the offering in addition to examining initial day returns. This extension provides information for individual investors hoping to hold IPOs for longer periods than those examined in Affleck-Graves, Hegde, Miller, and Reilly (1993). Second, we measured performance of the IPO from both the offer price and the price at the end of the first day of trading. Assuming initial investment from the end of the first day of trading is a more reasonable assumption for most individual investors.

Differences in the initial and aftermarket performance of IPOs listing with the NYSE and NASDAQ have important implications for individual investors. For example, if the NYSE IPOs have higher one year adjusted returns than NASDAQ IPOs , short-term

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investors would be better off selecting the securities going public on the NYSE for their portfolios. Individual investors would have an additional factor to consider when determining whether or not to participate in an IPO if the original listing market for the security potentially affects their returns.

Review of the Literature

Academic research by Chalk and Peavy (1987), Miller and Reilly (1987), Ibbotson, Sindelar, and Ritter (1988), Ritter (1991), and Aggarwal and Rivoli (1990) among others documented large returns on the first day of trading for investors who were able to obtain the stock at the offering price in an IPO. The significant increase in stock price in early trading represents foregone proceeds to which the issuing firm no longer has access to support its future operations.

A number of theories for the large positive initial returns to IPOs exist, including insurance for the investment banker (Beatty & Ritter, 1986; Tinic, 1988), existence of a principle-agent problem (Baron (1982), and signaling theories (Allen & Faulhaber, 1989). Other potential explanations for the large initial returns include a method for attracting uninformed investors (Rock, 1986), the presence of investment fads (Aggarwal & Rivoli, 1990; Camerer, 1989; DeBondt & Thaler, 1985; Shiller, 1981), and the reputation of the IPO underwriter (Carter, Dark & Singh, 1998).

Another issue related to the pricing of IPOs concerns their long run performance relative to the market. Although IPOs generally make excellent investments if investors can purchase the stock at the offer price and hold it for only one day, long run returns have not as high. Muscarella and Vetsuypens (1989), Aggarwal and Rivoli (1990), and Ritter (1991) found that investors in IPOs earned negative returns after the first day of trading. Loughran and Ritter (1995) found empirical evidence that IPOs underperform relative to a group of matching firms. Although theories about the long run underperformance of IPOs are not as numerous as those proposed to explain the initial returns to IPOs, some hypotheses relating to the phenomenon do exist. Loughran and Ritter suggested that the underperformance in the aftermarket is potentially due to investors "betting on longshots." Loughran and Ritter (1995) proposed that this underperformance pattern persists because investors are "systematically misestimating the probability of finding a big winner." Carter et al. (1998) found that IPOs with high quality underwriters outperformed IPOs with lower quality underwriters in the IPO aftermarket. Hensler, Rutherford and Springer (1997) found that factors such as size, risk, industry performance, and underwriter reputation can affect the long run survival and performance of IPOs

The results of previous research suggest that the IPO market may be a poor place for individual investors to put their money. Individual investors are rarely given the opportunity to invest initially in IPOs. This causes them to miss the initial runup in stock price. However, individual investors often experience the poor aftermarket performance of these issues as they generally enter the IPO market sometime after the end of the first day of the offer. In addition to this problem, individual investors are less likely than more sophisticated investors to understand the types of issues related to IPO underpricing discussed in the academic literature. It would be helpful to less sophisticated investord if they could use an easily observable summary measure to identify good IPO investment opportunities. This study examines one potential summary measure that could allow individual investors to discriminate easily between "good" and "bad" IPOs.

We used exchange listing as a summary measure because previous research provided support for the hypothesis that investors can interpret information about exchange listing as a potential signal of performance. Webb (1999) found a significant decrease in the performance of a sample of 503 firms during the period 1974 to 1993 that changed their exchange listing from the NASDAQ to NYSE. For a sample of 895 firms during the 1971 to 1994 period, Elyasiani, Hauser and Lauterbach (2000) found positive abnormal returns for firms that transfer their exchange listing from the NASDAQ to the NYSE or AMEX. Although these studies did not deal specifically with IPOs, they provide some support for the hypothesis that initial exchange listing may provide a signal to investors.

Since a change in exchange listing can be used as a signal by firms with publicly traded equity, it could be used as a signal by firms entering the equity markets for the first time. We hypothesized that the listing exchange provides investors with a simple selection criterion that can be used for investing in IPOs. In particular, we hypothesized that differences in exchange listing requirements result in differences in the initial and aftermarket performance of IPOs.

Data

The sample used in this study was obtained from

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Securities Data Corporation's World Wide New Issues database. We screened the database for IPOs that list on the NASDAQ National Market System and the NYSE from January 1986 to October 1996. We excluded all IPOs with missing exchange codes and those with missing price observations. After screening the sample for missing observations, the sample included 3,176 IPOs. Our final sample included all firms that have price information for 250 trading days following the IPO on the Center for Research in Security Prices (CRSP) database. This restriction yielded a final sample of 3,113 firms. We divided the sample by exchange listing and form subsamples containing 878 IPOs on the NYSE and 2,235 IPOs on NASDAQ. We also formed a matched sample of NYSE and NASDAQ IPOs to control for size and industry. In our original sample, NYSE IPOs and NASDAQ IPOs were sorted by three digit Standard Industrial Classification (SIC) code and then NYSE IPOs were matched with same industry NASDAQ IPOs that were closest to each other in size. Due to the discrepancy in the number of NYSE and NASDAQ IPOs in the original sample, the sample size of the size and industry-controlled sample decreased to 403 firms.

Table 1 presents summary statistics of the 3,113 IPOs sorted by exchange. The mean size of an offering on the NYSE was $176,639,689 while the mean size of a NASDAQ offering was much smaller at only $30,548,873. The range of the offering size for IPOs on the NYSE was also much larger than the range for NASDAQ IPOs.

Methodology

Using our entire sample of 3,113 IPOs, we calculated two separate sets of mean excess returns. The first set of IPO returns were determined using the time period from the point of the initial offer price to a specific point in time after the IPO. We found IPO returns for 1, 2, 3, 4, 5, 10, 20, 40, 62, 125, and 250 trading days following the offering. Since most individual investors are unable to buy IPOs at the offer price, we calculated a second set of IPO returns where we assume purchase at the end of the first day of trading. The return for security i purchased on the day of offer (day 0) and sold on day t is defined as:

$$r_{it} = (P_{it} - P_{i0}) / P_{i0} \qquad (1)$$

where

P_{it} = the closing price of security i at the end of day t of trading after the initial offering,

P_{i0} = the initial offering price of security i, and

r_{it} = the return for security i purchased on day 0 and sold on day t.

We calculated the set of IPO returns assuming purchase at the end of day 1 using a similar equation, however we replaced P_{i0} with P_{i1}, where P_{i1} is the price of security i at the end of day 1.

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Table 1.
Summary statistics of 3,113 IPOs for the period 1986-1996, Sorted by Exchange Listing.

		(Dollar amounts in thousands)		
		New York	**NASDAQ**	**Total**
Mean Size of Offering		$176,640	$30,549	$71,753
Median Size of Offering		$104,700	$22,500	$31,000
Std Deviation of Size		$231,302	$40,201	$143,389
Range:	Low	$4,500	$380	$380
	High	$2,647,000	$1,190,000	$2,647,000
% of Issues with Negative Day 1 Excess Returns		31.89%	20.00%	23.32%
Sample Size		878	2,235	3,113

To calculate the excess return, we compared the IPO returns for each day with a benchmark of market returns (CRSP value-weighted index[a] of all NYSE/AMEX/NASDAQ stocks) over the same time period. The return on the market index over a specific time period was defined as:

$$r_{mt} = (I_t - I_0)/ I_0 \quad (2)$$

where
I_t = the value of the CRSP value-weighted index at the end of day t;
I_0 = the value of the CRSP value-weighted index at the end of day 0; and
r_{mt} = the return on index from day 0 to day t.

We also calculated returns[b] on the market index from the end of day 1 to day t to use for comparison with the IPO returns of firms where we assumed purchase at the end of day 1.

We then calculated the excess return for security i purchased on either the day of offer or the end of day 1 and sold on day t. We found the excess return for security i as follows:

$$ar_{it} = (r_{it} - r_{mt}) \times 100 \quad (3)$$

where
ar_{it} = excess return on security i at time t,
r_{it} = the return for security i purchased on day 0 and sold on day t, and
r_{mt} = the return on the CRSP value-weighted index from day 0 to day t.

The excess return for security i is the difference between the IPO return over time and the return on the market index over the same period. This calculation provides a measure of both initial performance of the IPO relative to the market index and also aftermarket performance of the IPO relative to the market index.

Next, we calculated the average risk-adjusted return for all IPOs initially listing on the NYSE and the average risk-adjusted return for all IPOs initially listing on NASDAQ. The average risk-adjusted return is simply the average of the excess returns calculated using Equation 3. The average risk-adjusted return for all NYSE IPOs when buying at the initial offer date and selling t trading days later is defined as:

$$AR_t = \frac{1}{n}\sum_{i=1}^{n} ar_{it} \quad (4)$$

where
AR_t = average risk-adjusted return for all IPOs on the NYSE,
ar_{it} = excess return for security i at time t, and
n = number of securities initially listing on the NYSE.

We also computed an average risk-adjusted return for all n securities initially listing on the NASDAQ. Using the average risk-adjusted returns at time t allowed us to determine the average amount that IPOs either overperform or underperform relative to the market over a certain period.

We used a z-test to determine whether the risk-adjusted excess returns are significantly different from zero. The z-test, assuming non-equal variances, was calculated as follows:

$$z = \frac{AR_1 - AR_2}{\sqrt{\frac{s_1^2}{n_1}} + \sqrt{\frac{s_2^2}{n_2}}} \quad (5)$$

where
z = normal deviate for testing the difference in means between samples of NYSE and NASDAQ IPOs,
AR_1 = average excess returns for NYSE IPOs,
AR_2 = average excess returns for NASDAQ IPOs,
s_1 = standard deviation of excess returns for NYSE IPOs,
s_2 = standard deviation of excess returns for NASDAQ

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IPOs,
n_1 = sample size of NYSE IPOs, and
n_2 = sample size of NASDAQ IPOs.

To conclude the study of the returns to IPOs segmented by market listing, we examined a size and industry-controlled sample of firms. Ritter (1991) used this method to evaluate IPO performance. Due to the more stringent listing requirements of the NYSE, the listing market may be segmented so that larger firms tend to list on the NYSE and smaller firms on NASDAQ. The market may also be segmented so that firms in certain industries are more likely to list on the NYSE. Both size and industry are potential summary measures individual investors could easily use to differentiate IPOs. To determine whether market listing is simply proxying for firm size or industry in our examination of the performance of NYSE and NASDAQ IPOs, we performed similar tests as those described above on a size and industry-matched sample. To form the matched sample, all firms were sorted based on three-digit SIC code. NYSE IPOs and NASDAQ IPOs were then matched with another IPO firm that is the closest in size and has the same three-digit SIC code. Since both IPOs in a matched pair occur on different days, we controlled for market-wide effects by subtracting the CRSP value-weighted market return on the corresponding dates from the observed return for both the NYSE and NASDAQ IPOs. We used only a subset of our sample in this test in order to directly examine the effect of exchange listing while controlling for industry and firm size. Comparing same industry NASDAQ IPOS to size-matched NYSE IPOs allowed us to examine exchange effects with size and industry held constant for a subset of comparable IPOs. All of the above tests were performed using market-adjusted returns.

To test the relationship between a set of variables including size, beta, offer price, and a exchange dummy, and both short and long-run excess returns in a multivariate setting, we used regression analysis. We regressed the abnormal returns on offer price, beta, the natural log of size, and an exchange dummy equal to 1 if the IPO is a NASDAQ IPO and zero if the IPO was from the NYSE. The regressions were done using returns from both the offer and the end of the first day of trading for 1, 2, 3, 4, 5, 10, 20, 40, 62, 125, and 250 trading days following the IPO.

Results

To investigate the initial and aftermarket performance of IPOs, we initially examined the entire sample of IPOs. Panel A of Table 2 presents the market-adjusted returns from the offer price for all 3,113 IPOs in our sample. When the returns were calculated from the offer price, we found positive and significant excess returns for all time periods examined including up to 250 trading days following the initial offer. These findings are consistent with the results of previous studies by Aggarwal and Rivoli (1990) and Ibbotson et al. (1988). Panel B of Table 2 examines excess returns over the same period assuming an investment at the end of the first day of trading. When the offer day was excluded, IPO returns in the short run were significantly less than the market index, for 4 and 5 trading days, and close to significance for 3 and 10 days. Following the second week of trading and extending out 125 trading days after the offer, IPO returns were significantly greater than the market index. Market-adjusted returns on the full sample of IPOs through the first 250 days of trading were negative and significantly different from zero.

Using the entire sample of 3,113 IPOs for the period 1986 to 1996, we calculated mean excess returns from the offer price (Panel A) or the end of the first day of trading (Panel B) to the stated points in time following the offering. The mean excess return for security i was calculated as the difference between the return for security i purchased at either the offer price or the price at the end of the first day and the return to the CRSP value-weighted market index over the same period.

Following the testing of all IPOs in the sample, we divided the securities into two samples based on the original listing market. Panel A of Table 3 presents market-adjusted returns of the IPOs on both the NYSE and NASDAQ from the offer price through the first two weeks of trading. For both the NYSE sample and the NASDAQ sample of IPOs, we found evidence of significant initial underpricing. Panel A of Table 3 shows that on average, the short run returns for NYSE IPOs were positive and significantly greater than the benchmark. The pattern for NASDAQ IPOs was similar except that the initial returns were even larger for the NASDAQ securities. Similar to the NYSE securities, returns declined over the first two weeks, but they remained positive and significantly larger than the market index.

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Table 2.
Value-weighted market-adjusted returns of 3,113 IPOs up to one year for the period 1986 to 1996.

PANEL A. Mean Excess Return from Offer Price.

	AR_t	t-Statistic
Days from Offer		
1 Day	.1040	32.57†
2 Days	.1036	31.93†
3 Days	.1018	31.01†
4 Days	.1008	29.67†
5 Days	.1008	28.75†
10 Days	.1001	25.42†
20 Days	.1192	25.66†
40 Days	.1313	22.41†
62 Days	.1397	20.19†
125 Days	.1211	12.76†
250 Days	.0535	4.60†

PANEL B. Mean Excess Return Less Day 1 Return.

	AR_t	t-Statistic
Days from Offer		
2 Days	-.0003	-0.37
3 Days	-.0021	-1.82
4 Days	-.0030	-2.21†
5 Days	-.0031	-2.06†
10 Days	-.0037	-1.78
20 Days	.0155	5.20†
40 Days	.0266	5.86†
62 Days	.0354	6.04†
125 Days	.0169	1.93*
250 Days	-.0501	-4.40†

* $p < 0.05$ † $p < 0.01$

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Table 3.
Value-weighted market-adjusted performance of IPOs from offer price (end of day 1) up to 10 days of trading sorted by size of exchange listing.

Panel A. Mean Excess Return from Offer Price For NYSE and NASDAQ IPOs.

	NYSE IPOs			NASDAQ IPOs		
	AR_t	Standard Error	t-Statistic	AR_t	Standard Error	t-Statistic
Days from Offer						
1 Day	.0431	.0032	13.62†	.1278	.0042	30.74†
2 Days	.0440	.0034	12.90†	.1270	.0042	30.14†
3 Days	.0433	.0036	12.11†	.1247	.0043	29.33†
4 Days	.0425	.0036	11.64†	.1237	.0044	28.01†
5 Days	.0425	.0038	11.24†	.1237	.0046	27.11†
10 Days	.0395	.0045	8.75†	.1239	.0051	24.28†

Panel B. Mean Excess Return from End of Day 1 for NYSE and NASDAQ IPOs.

	NYSE IPOs			NASDAQ IPOs		
	AR_t	Standard Error	t-Statistic	AR_t	Standard Error	t-Statistic
Days from Offer						
2 Days	.0009	.0012	0.73	-.0008	.0011	-0.70
3 Days	.0002	.0014	0.16	-.0030	.0015	-2.01*
4 Days	-.0005	.0015	-0.34	-.0040	.0018	-2.22*
5 Days	-.0005	.0017	-0.32	-.0040	.0020	-2.06*
10 Days	-.0036	.0025	-1.41	-.0037	.0027	-1.38

Panel C. Test of Differences of Mean Returns of NYSE IPOs less NASDAQ IPOs.

	Z Score from Offer Price	Z Score from End of Day 1
Days from Offer		
1 Day	-16.22 †	
2 Days	-15.32†	1.01
3 Days	-14.66†	1.56
4 Days	-14.18†	1.47
5 Days	-13.71†	1.35
10 Days	-12.38†	0.04

* $p < 0.05$ † $p < 0.01$

Mean excess returns were calculated separately for samples of NYSE and NASDAQ IPOs from the offer price (Panel A) and the end of the first day of trading (Panel B) to the stated points in time following the offering to investigate the initial returns to IPOs. The mean excess return for security i was calculated as the difference between the return for security i purchased at the offer price (end of day 1) and the return to the CRSP value-weighted market index over the same period. Panel C shows results from difference in the means tests between average excess returns on NYSE and NASDAQ IPOs using a z-test.

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Panel B of Table 3 presents results from tests where returns are calculated from the end of the first trading day rather than from the offer price. When the returns from the first trading day were excluded, we found no evidence of significant returns to the NYSE securities. Panel B also shows that when the returns for the first day were excluded for the NASDAQ IPOs the returns are negative and significant relative to the NASDAQ benchmark at 3, 4, and 5 days.

Panel C of Table 3 presents results for z-tests of the difference in the means for the initial performance of NYSE and NASDAQ IPOs. The results indicate that for initial trading starting at the offer price, NASDAQ IPOs earned significantly larger returns than NYSE securities with the difference being significant for all time periods through the first two weeks of trading. When difference-in-the-means tests were performed for NYSE and NASDAQ IPO returns calculated from the end of the first day of trading, NASDAQ returns were no longer significantly different from the NYSE returns.

Table 4 presents results for our investigation of the aftermarket performance of IPOs. In Panel A, we report the performance from the offer of NYSE and NASDAQ IPOs relative to the market index and then look at the differences between the performance of the firms depending on where they list. Panels A shows that NYSE IPOs were significantly greater than the market index for 20, 40, and 62 trading days following the IPO. It also shows that NASDAQ IPOs were significantly larger than the market index for all periods up through the first 250 days of trading.

Panel B of Table 4 has results for the long run tests when the first day of trading was excluded from the return calculations. Excess returns for the NYSE IPOs were insignificantly different than the benchmark returns for the earlier periods. For both 125 and 250 trading days following the offer, excess returns for the NYSE IPOs were significantly less than the returns on the CRSP value-weighted market index. The pattern is very different for NASDAQ IPO returns. The returns were significantly larger than the market index for all periods examined up to 250 trading days following the IPO. The pattern reversed as the returns for the NASDAQ IPOs at 250 trading days were significantly less than the returns to the index.

Panel C of Table 4 gives results of difference in the means tests for long-term returns of NYSE and NASDAQ IPOs. The excess returns from the offer price for NASDAQ IPOs are significantly larger than the returns for the NYSE IPOs for all periods investigated. As the differences declined in significance over time, it appears that many of the excess returns over the NYSE were earned by the NASDAQ securities in periods of time closer to the offer day. The long run returns from the end of day 1 for the NASDAQ IPOs are significantly larger than the returns to the NYSE IPOs, except for 250 trading days. When the offer day is excluded, the difference in NASDAQ and NYSE returns were much smaller than they are when the returns are calculated from the offer price. As most individual investors are unable to buy IPOs at the offer price, the price at the end of day 1 is the more relevant price for many investors.

To ensure that the differences that we document in the returns of NASDAQ and NYSE IPOs were not driven by size or industry, we performed tests using a matching sample of firms matched by both size and three-digit SIC code. The results of these tests appear in Table 5. Panel A shows the difference in excess returns between NASDAQ and NYSE IPOs using the offer price as the starting point for calculations. Even after controlling for both industry and size, we find that NASDAQ IPOs earned significantly larger excess returns from the offer price than NYSE IPOs except for the 250 trading day period. The size of the difference declines moving out in time from the offer.

Panel B summarizes the differences in the mean excess returns in the industry and size-controlled sample when returns were calculated from the end of the first day of trading. In the two weeks following the IPO, there is no significant difference in NASDAQ and NYSE IPO returns when calculated from the end of the first day of trading. From the end of the first month through the end of the first three months of trading using the size and industry-matched sample, NYSE IPOs earned significantly larger returns when returns were calculated from theprice at the end of the first day of trading. Returns at the end of the first year of trading were significantly larger for the NASDAQ IPOs than the NYSE IPOs.

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Table 4.
Value-weighted market-adjusted performance of IPOs from offer price up to 250 days of trading sorted by exchange listing.

Panel A. Mean Excess Return from Offer Price For NYSE and NASDAQ IPOs.

	NYSE			NASDAQ		
	AR_t	Standard Error	t-Statistic	AR_t	Standard Error	t-Statistic
Days from Offer						
20 Days	.4370	.0050	8.67†	.0008	.0034	0.23
40 Days	.0391	.0067	5.87†	-.0039	.0054	-0.72
62 Days	.0368	.0079	4.68†	-.0062	.0067	-0.93
125 Days	.0150	.0134	1.45	-.0273	.0094	-2.91†
250 Days	-.0239	.0147	-1.62	-.0658	.0140	-4.69†

PANEL B. Mean Excess Return from End of Day 1 for NYSE and NASDAQ IPOs.

	NYSE			NASDAQ		
	AR_t	Standard Error	t-Statistic	AR_t	Standard Error	t-Statistic
Days from Offer						
20 Days	.1488	.0060	24.62†	.0212	.0039	5.41†
40 Days	.1675	.0076	22.06†	.0385	.0059	6.50†
62 Days	.1801	.0090	20.04†	.0517	.0077	6.71†
125 Days	.1627	.0125	13.06†	.0342	.0116	2.96†
250 Days	.0839	.0151	5.56†	-.0439	.0149	-2.95†

Panel C. Test of Differences of Mean Returns of NYSE IPOs less NASDAQ IPOs.

	Z Score from Offer Price	Z Score from End of Day 1
Days from Offer		
20 Days	-13.35†	-3.95†
40 Days	-12.71†	-5.28†
62 Days	-12.01†	-5.68†
125 Days	-9.10†	-4.13†
250 Days	-5.11†	-1.07

* $p < 0.05$ † $p < 0.01$

Mean excess returns are calculated separately for samples of NYSE and NASDAQ IPOs from the offer price (Panel A) and the end of day 1 (Panel B) to the stated points in time following the offering to investigate the long-run performance of the IPOs. The mean excess return for security i is calculated as the difference between the return for security i purchased at the offer price (end of day 1) and the return to the market index over the same period. Panel C shows results from difference in the means tests between average excess returns on NYSE and NASDAQ IPOs using a z-test.

Table 6 shows the results of the multivariate regressions of excess returns on offer price, beta, size, and an exchange dummy. Panel A presents regression results that use excess returns calculated from the offer price as the dependent variable. Up through the first three months of trading the results of the regressions are similar. Returns for these periods are significant and negatively related to the size variable. The excess returns are significant and positively related to the offer price, the firm's beta, and also the exchange dummy. The

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positive and significant relationship between returns and the exchange dummy suggests that even in a multivariate setting when other variables that have been previously shown to affect IPO returns are included, the initial decision to list with NASDAQ is important for returns. Using adjusted returns for six months and one year following the IPO, the relationships between excess returns and beta and size remain significant.

Panel B of Table 6 presents regression results that use excess returns calculated from the end of the first day of trading as the dependent variable. Although the early regressions are not significant, the regressions from two weeks through one year following the IPO are all significant. From two weeks through three months of trading, beta, the only variable that is significant, is positive and significantly related to the excess returns. Using the excess returns for the first six months of trading, beta and the offer price are both significant and positively related to returns. For regressions using the excess returns from 250 trading days from the end of the first day of trading following the IPO, size is significant and negatively related to returns, and offer price, beta, and the exchange dummy are all significant and positively related to returns. Again, the significant positive relation between the exchange dummy and excess returns indicates that listing on NASDAQ is positively related to returns for the first year of trading.

Conclusions

Prior research indicated that firms that make an initial public offering of common equity generate large initial excess returns relative to the market index. Previous studies also found that the returns of a firm making an IPO underperform returns on the market in the long run. We examined both the initial returns and the aftermarket performance of IPOs, but we made distinctions between IPOs listed on the NYSE and those listed on NASDAQ. We suspected that the differences in the listing requirements implied inherent differences in the types of firms listing in a particular market. Based on these differences in listing requirements, we expected that differences exist in both the initial and aftermarket performance of IPOs between firms listing on the NYSE and NASDAQ.

Table 5.
Value-weighted Market-adjusted Performance of NYSE IPOs less NASDAQ IPOs for a Size and Industry-matched sample for up to 250 days of trading.

Panel A. Mean Excess Return from Offer Price.

	AR_t	t-Statistic
Days from Offer		
1 Day	-.0444	-4.34†
2 Days	-.0403	-3.89†
3 Days	-.0395	-3.59†
4 Days	-.0401	-3.62†
5 Days	-.0419	-3.65†
10 Days	-.0457	-3.41†
20 Days	-.0719	-4.43†
40 Days	-.0873	-4.57†
62 Days	-.0944	-4.12†
125 Days	-.0742	-2.10*
250 Days	.0419	1.07

Panel B. Difference between NYSE and NASDAQ Return Less Day 1 Return.

	AR_t	t-Statistic
Days from Offer		
2 Days	-.0049	-1.56
3 Days	-.0057	-1.36
4 Days	-.0053	-1.14
5 Days	-.0036	-0.73
10 Days	-.0001	-0.02
20 Days	.0260	2.31*
40 Days	.0406	2.51*
62 Days	.0497	2.45*
125 Days	.0348	1.03
250 Days	-.0810	-2.01*

* $p < 0.05$ † $p < 0.01$

Using a size and industry-matched sample of NYSE and NASDAQ IPOs , we calculated the difference in the returns of NASDAQ IPOs and NYSE IPOs from the offer price (Panel A) or the end of the first day of trading (Panel B) to the stated points in time following the offering. The difference in returns for the matched pair was calculated as the difference between the return for a NYSE IPO purchased at either the offer price or the price at the end of the first day and the return for a NASDAQ IPO. The NASDAQ IPO and the NYSE IPO were matched by size and three-digit SIC code.

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Table 6.
Regression of Excess Returns on Characteristics of IPO.

Panel A. Excess returns calculated from the offer price.

Excess Returns	Offer Price	Beta	Exchange dummy	ln of Size	Prob>F
return1	0.008†	0.053†	0.055†	-0.022†	0.0001†
return2	0.007†	0.054†	0.051†	-0.022†	0.0001†
return3	0.007†	0.053†	0.048†	-0.023†	0.0001†
return4	0.007†	0.053†	0.047†	-0.023†	0.0001†
return5	0.008†	0.054†	0.047†	-0.025†	0.0001†
return10	0.008†	0.060†	0.050†	-0.024†	0.0001†
return20	0.008†	0.079†	0.069†	-0.019†	0.0001†
return40	0.008†	0.100†	0.074†	-0.020†	0.0001†
return62	0.008†	0.120†	0.063†	-0.029†	0.0001†
return125	0.002	0.152†	0.015	-0.033*	0.0001†
return250	0.002	0.149†	-0.056	-0.050†	0.0001†

Panel B. Excess returns calculated from the end of the first day of trading.

Excess Returns	Offer Price	Beta	Exchange dummy	log of Size	Prob>F
return 2	-0.0005	0.0003	2.00E-12	0.0007	0.2928
return 3	-0.0005	-0.0009	8.85E-13	0.0004	0.3794
return4	-0.0005	-0.0008	2.06E-12	0.0005	0.6206
return 5	-0.0002	-4.00E-5	-3.32E-12	0.0003	0.9328
return 10	0.0005	0.0069†	-2.56E-12	0.0001	0.0287*
return 20	0.0008	0.0277†	-1.15E-11	-0.0007	0.0001†
return 40	0.0001	0.0505†	-1.38E-11	-0.0020	0.0001†
return 62	-0.0006	0.0689†	-1.13E-11	-0.0047	0.0001†
return 125	-0.0056†	0.0949†	6.80E-12	-0.0017	0.0001†
return 250	0.0742†	0.0359*	2.53E-9†	-0.4919†	0.0001†

* $p < 0.05$ † $p < 0.01$

Using the full sample, excess returns are regressed on offer price, beta, an exchange dummy, and the ln of size of offer. The exchange dummy is a variable equal to 1 when the IPO is offered on the NASDAQ and 0 when the IPO is offered on the NYSE. Panel A uses excess returns calculated from the offer price. Panel B uses excess returns where returns are calculated from the end of the first day of trading.

When we separated IPOs based on exchange, we found that NASDAQ IPOs had significantly larger initial returns than the returns for NYSE IPOs when returns were calculated from the offer price. As most individual investors are not able to buy an IPO at the offer price, this result is only relevant for investors who can buy the stock at the offer price.

There is also evidence that the returns to the NASDAQ IPOs were significantly larger than the returns to the NYSE IPOs over the first year of trading. Although the results for the NYSE and NASDAQ samples are both consistent with the results when the entire sample is tested, the evidence indicates that differences exist between the average IPO returns on the NYSE as compared to the NASDAQ. Although large differences exist between NYSE and NASDAQ IPO returns on the initial day of trading, these returns are not driving the aftermarket performance results. Even when the first day of trading is excluded, we continue to find that the NASDAQ IPOs earn significantly larger returns than NYSE IPOs from the end of the first month to the end of the sixth month of trading. This result is relevant for individual investors as the returns are calculated from the end of the first day of trading.

We also performed tests on a size and industry-controlled sample and found that these results remained consistent with earlier evidence that suggested that from the offer, returns to NASDAQ IPOs were significantly larger than returns to NYSE IPOs. While the results from the multivariate regressions did not show significant relations in all cases, the decision by firms to be traded on NASDAQ positively affected the level of returns over the first three months of trading when return calculations were made from the offer price. When returns are

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calculated from the end of the first day of trading, a similar relationship is also found for excess returns over the first 250 days of trading.

These results suggest that individual investors have access to a potential summary measure to assist them in identifying "good" investment opportunities when they choose to participate in an IPO. Individual investors can avoid the previously documented underperformance in IPOs by investing in NASDAQ IPOs at the end of the first day of trading and holding these issues for up to one year, with a three-month holding period being optimal in the current sample. If individual investors are able to purchase shares at the offer price, the observed return differences are even greater for NASDAQ IPOs. The market in which a firm initially decides to issue stock is important as it affects both the initial and long run performance of the securities.

Endnotes

a. *We also repeated all tests using the CRSP equally-weighted index as the benchmark. Results are not substantially different.*

b. *In formulas (1) and (2) the return calculations all include the future value of any reinvested dividends paid out by the firms.*

c. *Hogan and Olson (1998) found that firm size was related to IPO returns.*

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