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**DO STOCK MARKETS AFFECT INITIAL PUBLIC OFFERINGS  
PERFORMANCE? A COMPARATIVE STUDY OF  
NASDAQ AND NYSE STOCK MARKETS**

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**ABSTRACT**

We examined the performance of initial public offerings during the recent financial crisis in two major US stock markets: NASDAQ and NYSE. During 2008-2009 a major Financial Crisis shocked the IPO market resulting in a massive decrease in offers during these years. We find evidence to show that during the financial crisis period, NASDAQ IPO's underperform more than the NYSE IPO's which had an overall higher wealth relative. However, their wealth relative was below one indicating that both the NASDAQ and NYSE IPO's underperformed compared to their respective matching firms, which were matched on market capitalization size.

**Keywords:** IPOs, NYSE, NASDAQ, Performance, Stock

**1. INTRODUCTION**

This study compares the long term IPO performance on the NASDAQ and the NYSE exchange. Initial Public Offerings (IPOs) have long been in existence since formal exchanges were first developed. Over the decades of research, three major anomalies have developed over and over again. The first being a short-run under-pricing phenomenon in which some possible reasons for this could be that investment banks intentionally under-price the IPO offering for a variety of reasons such as giving investors an initial gain, and the investment banks making sure enough subscription for the offer is made. Second, a "hot issue" market phenomenon, which is when an extensive amount of IPO's are happening at one time or for a specific length of time, originally

discovered by Ibbotson and Jaffe (1975). Thirdly, an anomaly described by Ritter (1991), as IPO's in the long run are overpriced and underperform.

The contributions that are made in this paper focus on the comparisons of the NASDAQ and NYSE exchanges. Studies such as Ritter (1991), Loughran and Ritter (1995), Carter, Dark, and Singh (1998), Guo, Baruch and Shi (2006) focused generally on IPO's that went public on either exchange and not compared one against the other. A past study like Loughran and Ritter (1993) focused more directly on the comparisons of performance that IPO's have on the NASDAQ and NYSE, but misses the most current data available. This study also focused on data that involves the earlier time period of the NASDAQ, which was established in 1971. What has been added in this study is a more in-depth analysis of these exchanges when pulled apart, compared and a sample that was affected by the 2008-2009 Financial Crisis. The affects of this event provide insight that was not available to past researchers because of timing. Some of the most famous IPO research was conducted during the late 1980's and throughout the 1990's, but the contributions in this paper provide a more current and time relevant examination of IPO's. Further contributions of our study include an analysis of IPOs and respective matching firms that were affected by one the most significant financial crisis to occur in United States history. Our paper contributes evidence that validates previous research that was done by Loughran and Ritter (1991); , Carter, Dark and Singh (1998) that in the long-term, underperformance does occur in IPOS even during a major crisis like 2008-2009.

The objective of this study is to compare and contrast by empirically testing the long-term performance of IPOS on two United States of America exchanges. We provide evidence to either prove or disprove that long run underperformance is prevalent and persistent in Initial Public Offerings and identify key relationships and results using key variables like market capitalization, gross proceeds, book to market ratios, index returns, age of the companies and three-year holding period returns to help clarify empirical results to make a deciding decision on how or where underperformance does or does not happen. Finally, we test similar methodologies of previous researchers during a time period of the largest financial crisis in the United States.

Overall, this study focused and emphasised on conducting three-year buy and hold returns for IPO's from the NASDAQ, NYSE and matching firms which was used to compute wealth relatives. Wealth relatives are a quantifiable measure used to test the under or over performance of IPO's. The rest of the paper is organised as follows: Section 2 is the literature review. Section 3 is the methodology, while Section 4 is the result and discussion of findings. Conclusion is Section 5.

## **2. LITERATURE REVIEW**

Black (1986) talks about the effects of noise in finance. He attributes a part of noise as investors acting on a utility based theory. The utility-based theory says that an investor is trying to maximize his or her own wealth. Ritter (1991) says that firms who went public between 1975-1984 underperformed when they were compared to a control sample that were matched to IPO companies by industry or market capitalization. Ritter also identifies that young growth companies underperformance was highly correlated with IPOS. He believes this underperformance was due to an overoptimistic view by investors. Perhaps these investors were basing their own personal views on the utility-based theory that Black mentions, but this is hard to measure. Ritter (1991) also believes that this underperformance of long-run IPO's could be a result of risk miss-measurement, bad luck or a fad in the market. The concept of a fad being present is consistent with the research and findings of Schiller (1990) which examines the issues surrounding under-pricing and "hot Issues". The concept of fad (Ritter 1991) suggests that the advice stockbrokers are giving to investors is perhaps a falsity and more "smoke and mirrors" for any long-term investor.

Ritter (1991) focused on three-year holding period returns and reveals that the IPO performance was 34.47% for a sample of 1,526 IPO's. Comparably, the control sample over the same three-year holding period had a return of 86%; hence his final conclusion of IPO's underperforming. A shortfall of his study was that he did not test beyond a three-year holding period and feels underperformance wouldn't go further past this time period. This assumption is consistent with Ibbotson (1975) who found no long-run underperformance in a study of five years after a company issued an IPO. Loughran (1993) finds that using a six-year calendar year, long-run underperformance is present in companies that went public. His findings also suggest that approximately 60% of return differences can be a result of poor performances by IPO's. Loughran's study was one that focused on the comparisons of the NYSE and NASDAQ exchanges in the US only. Possibly Loughran's approach to looking at two exchanges side by side provided the results he achieved compared to Ibbotson (1975). However, Ibbotson's data does not involve the NASDAQ since the NASDAQ was not created until 1971, so it is difficult to compare.

Loughran's (1993) study tested NYSE and NASDAQ returns separately and found that the NASDAQ firms underperformed the NYSE listed firms. He believes that value stocks mostly reside on the NYSE and that the NASDAQ holds a different type of stock mainly that being growth orientated. He believes that because the two exchanges have a construction style difference, this could account for the differences in returns. However, Reinganum's (1990) study looks at differences between these two exchanges and finds no significant differentiation. What

Loughran (1993) does show is consistence with Ritter's (1991) study, except the fact that Ritter only captures part of the long-run IPO underperformance due to his research only consisting of a three-year holding period instead a five or six-year holding period. Both the studies of Ritter (1991) and Loughran (1993) find IPO underperformance in succinct periods coming after years with high volume acting IPO's.

Tech, Welch and Wong (1997) show that IPO underperformance is positively related to size of discretionary accruals in the fiscal year of the IPO. Larger accruals in the IPO year are a sign of more negative performance. Studies such as Brav and Gompers (1997) look into specific factors that may affect the long-term underperformance of IPO'S. They found that IPO's that had venture capital backing outperformed the non-venture capital backed IPO's using equal weighted returns. They suggest that the drastic underperformance of small non-venture backed firms could be because a result of investor sentiment and believe small IPO's may be more affected. They believe that these small IPO's are more affected because individuals tend to hold shares of small IPO's while institutions tend to stay away from shares in small IPO'S. Brav and Gompers (1997) concluded with contradictory evidence compared to Ritter and Loughran (1995) by showing underperformance is not just specific to companies that are issuing equity/going public. Getting rid of portfolios related to book-to-market and size they showed that IPO's actually do not underperform firms that do not issue equity.

Despite the amount of work that has been done on trying to figure out the reasons for long run underperformance as well as the other two major IPO anomalies of under-pricing and "hot issues", Researchers have focused more into specific things lately such as venture capitals backing or underwriter reputation to proxy for and fit into the theory of reasoning that IPO underperformance occurs because of asymmetric information. Ritter and Welch (2002) argue that asymmetric information is not the "primary driver" for this IPO phenomenon that happens. Also Guo, Lev and Shi (2006) state how many researchers attribute asymmetric information and mispricing to these phenomenon, but don't locate the sources of where they come from. Their evidence shows that those IPO's with high levels of R&D intensity have a lesser degree of underperformance and are positively correlated with the long run of IPO performances.

### **3. METHODOLOGY**

In this study the final samples that were constructed and developed were 391 IPO's from the NASDAQ exchange and 210 IPO's from the NYSE exchange. The time period in which the IPOs are derived are from the years of 2002-2010 and consists of time series data using event time. In order to be a part of the sample the IPO's had to meet certain requirements. First, Unit

Offerings, REITS, Mutual Funds, ADRS<sup>1</sup> and closed ended funds were excluded. Second, the IPO's had to have a minimum offer price greater than \$1. Third, the IPO's had to be offering common equity only. Fourth, gross proceeds of the IPO must have exceeded \$1 million. Most of this criteria is similar methodology and consistent with past literature. The data for the IPO'S was extracted using a variety of databases such as SDC, Bloomberg, Datastream and CRSP (Chicago Center for research in Security Prices). Before the final sample of the NASDAQ and NYSE were made, the data was filtered. Filtering the data may have caused a slight survivorship bias. Originally I started with 668 IPO's from the NASDAQ and 498 IPO's from the NYSE.

The returns for the NASDAQ IPO's, NASDAQ matching firms, NYSE IPO's and NYSE matching firms were found in the Datastream database. The Total Return Index was used instead of just price because the Total Return Index adjusts for any dividends or stock splits that may have occurred during the time periods. For the samples we found the 36 monthly returns by using the formula  $(p_2 - p_1) / p_1$ . From here the formula  $R_i = [\prod_{t=1}^{36} (1 + r_{it}) - 1] \times 100\%$  was used to find the three-year buy and hold return for each IPO and matching firm. In order to measure the three-year buy and hold return, the individual monthly returns were taken from the IPO offer date till its exact three-year anniversary date. This means that if the IPO offer date was on 15/03/2004, the individual monthly returns were taken for each month until 15/03/2007. Then the matching firm that was assigned to that IPO based on market capitalization size had its 36 monthly returns taken and calculated for the same exact dates as its respective IPO.

In order to test for long-term underperformance or over performance of IPO's, we created wealth relatives to make a quantifiable measure to judge the performance. Wealth relatives (WR) have been computed in many past literature papers and are a way to help test performance. We construct WR by matching an IPO with a matching firm based on some categorization method, and then taking 1 + 3yr. average returns of all the IPO's in that sample and dividing it by 1 + 3yr. average returns on the matching firms. To understand what this number means, a wealth relative that is larger than 1 indicates that the IPO's have outperformed the matching firms, and a wealth relative that is smaller than 1 indicates that the IPO's have underperformed (Loughran, 1993), Ritter and Loughran, 1995)

$$WR = \frac{(1 + \text{Average 3 Yr. Returns from IPO's})}{(1 + \text{Average 3 Yr. Returns from Matching Firms})}$$

As mentioned before, IPO's were matched up on market capitalization size. In our study we did not allow for any company to repeat over or be assigned to another IPO if the market caps were

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<sup>1</sup> American Depository Receipts (ADRS) are securities of non- US companies that trade in the US markets and pay out in US dollars.

similar. This means that if the matching firm was assigned to xyz IPO company it could not also be assigned to xzz IPO company. For any IPO that went public in 2002,2003 or 2004. The matching firm market cap as of 31/12/2001 was used to match them up appropriately. Any IPO that went public in 2005,2006 or 2007 used a matching firm market cap of 31/12/2004. Finally, any IPO that went public in 2008,2009 or 2010 used a matching firm market cap from 31/12/2007. This means that if an IPO went public in 2003, we would look for a matching firm's market cap that was last from the date of 31/12/2001. This division on three market cap time periods was done for both the NASDAQ and NYSE matching firms. This was done to allow the matching firms market cap to fluctuate like they would in real markets (Ritter, 1991).

#### **4. RESULTS AND DISCUSSION**

##### **A. Performance in Relation to Gross Proceeds**

We find that the total gross proceeds for the years during the crisis also dipped down, as firms were reluctant to take their companies public in fear of poor performance. When comparing this to the NYSE sample, we find that during the periods of the Financial Crisis less IPO's were offered more than normal, but with differences in the amount of gross proceeds per IPO. For the NASDAQ, many more IPO's were offered each year in comparison to the NYSE, but the proceeds each company received were substantially less. The IPO's that tend to go public on the NASDAQ tend to be smaller companies or less established companies than those who go public on the NYSE, otherwise known as the "Big Board".

This brings up the question of structural differences between these two exchanges. We agree with Loughrans (1993) argument that the returns between these two exchanges should differ because there are structural differences in the formation and IPO's contained within each exchange. Our finding is consistent with Loughran's (1993) that overall, the value of IPO stocks from the NYSE had higher returns than the growth IPO stocks of the NASDAQ. Reinganum (1990) finds that there are no significant differences to validate that the returns between the NASDAQ and NYSE are different because of the way that each exchange was comprised.

This indicates that those IPO's who receive small amounts of gross proceeds from their offer tend to perform the worst and negatively over the long run. We find that the wealth relative 0.58 is the lowest in the NASDAQ table. This indicates that, compared to its matching firms for the same categorical range, it not only the least, but it substantially unperformed in the long run compared to the matching firms. This indicates that over the long run period the IPO's created more volatility, and hence was riskier than the matching firms. Although in the NYSE returns we do not observe any negative three-year average

returns. The wealth relatives of the NYSE in Table 4, we found them not as spread out as in the NASDAQ gross proceeds which suggests that the under or over performance is not as big in the NYSE compared to the NASDAQ. Again, the NYSE IPO's that received the largest amount of gross proceeds from going public tend to over perform in the long run. This evidence is slightly contradictory compared to the results from Ritter (1991) which found that all gross proceed categories underperform in the long run. The difference in our study is that the NASDAQ and NYSE exchanges were split while Ritter kept them combined.

**Table 1: Market Capitalization Classification on 391 NASDAQ IPO's and Matching Firms for 2002 2010.**

Market Capitalization is calculated as Price x Number of Outstanding shares. In this table the Average three-year B&H Returns are found for both the IPO's and respective matching firms using the formula  $R_i = [\prod_{t=1}^3(1 + R_{it}) - 1]$  x 100%. For each designated Market Capitalization range a Wealth Relative was calculated using the formula

$$WR = \frac{(1 + \text{Avrg. 3Yr. Holding Period Return of IPO's})}{(1 + \text{Avrg. 3Yr. Holding Period Return of Matching Firms})}$$

except one from the NYSE. When looking at it from the gross proceeds perspective IPO's on the NYSE performed better than those on the NASDAQ. When looking at the mean returns and mean wealth relatives of both samples, the NYSE has a three-year average return at 0.26 and a higher wealth relative of 0.99 compared to .10 and .94 in the NASDAQ sample.

<b><u>Market Capitalization of IPO's</u></b>	<b><u>Number of IPO's</u></b>	<b><u>Three-year Avrg. B&amp;H Return IPO's</u></b>	<b><u>Three-year Avrg. B&amp;H Returns Matching Firms</u></b>	<b><u>WR</u></b>
Under 149,999,999	78	0.112	0.02	1.09
150,000,000-299,999,999	143	0.2691	0.4	0.91
300,000,000-499,999,999	100	0.0281	0.04	0.99
500,000,000 +	70	0.1314	0.19	0.95

**Table 2: Market Capitalization Classification on 210 NYSE IPO's and Matching Firms for 2002-2010.**

Market Capitalization is calculated by as Price x Number of Outstanding Shares. In this table the Average three-year B&H Returns are found for both the IPO's and respective matching firms using the formula  $R_i = [\prod_{t=1}^3 (1 + R_{it}) - 1] \times 100\%$ . For each designated Market Capitalization range a Wealth Relative was calculated .

<b><u>Market Capitalization of IPO's</u></b>	<b><u>Number of IPO's</u></b>	<b><u>Three-year Avrg. B&amp;H Return IPO's</u></b>	<b><u>Three-year Avrg. B&amp;H Return Matching Firms</u></b>	<b><u>WR</u></b>
Under 299,999,999	36	0.24	0.58	0.78
300,000,000-499,999,999	41	0.19	0.28	0.93
500,000,000-699,999,999	30	0.23	0.09	1.13
700,000,000-999,999,999	30	0.70	0.64	1.04
1 Billion +	73	0.23	0.17	1.05

**B. Performance in Relation to Market Capitalization**

Tables 1 and 2 show the relation of market cap ranges and the three-year average B&H returns for the NASDAQ IPO's, NASDAQ matching firms and wealth relatives. In Table 1, the NASDAQ sample size of 391 IPO's shows that returns for the IPO's tend to be all over the place no matter what category according to market caps the IPO was in. However, for the matching firm the corresponding returns tend to get better as the size increases. This suggests that in larger sized companies which are more mature, the returns for matching firms tend to better in the long run. The wealth relative shows that the smallest size category of less than 149 mil outperforms compare to their matching firms, but that as size increases this over performance become reduced in the long run. This suggests that companies who are larger at the time of an IPO could be overvalued more than a smaller company who is going public are high.



**Table 3. Age Classification on 391 NASDAQ IPO’s and Matching Firms for 2002-2010.**

Age of each of these IPO’s was found by taking information such as the offer year, date of foundation and date of incorporation from the SDC and Datastream databases. To find age of the company I took the difference between the year the company went public and the date of foundation. For those companies missing a date of foundation, date of incorporation was used in its place. In this table the Average three-year B&H Returns are found for both the IPO’s and respective matching firms using the formula  $R_i = [\prod_{t=1}^{36}(1 + R_{it}) - 1] \times 100\%$ . For each designated Age range a Wealth Relative was calculated using the formula

$$WR = \frac{(1 + \text{Avrg. 3Yr. Holding Period Return of IPO's})}{(1 + \text{Avrg. 3Yr. Holding Period Return of Matching Firms})}$$

<u>Age of Company</u>	<u>Number of IPO's</u>	<u>Three-Year Avg. B&amp;H Returns for IPO's</u>	<u>Three-Year Avg. B&amp;H Returns for Matching Firms</u>	<u>WR</u>
0-4	87	0.2604	0.18	1.07
5--9	160	0.1113	0.18	0.94
10--14	50	-0.0727	0.26	0.74
15+	94	0.2383	0.2	1.03
<b>Mean</b>		<b>0.13</b>	<b>0.21</b>	<b>0.95</b>

When comparing this to Table 2 and the sample size of 210 NYSE IPO’s I found a different result. For companies in the NYSE sample that were smaller at the time of the IPO, we find a higher degree of underperformance in the long run and for those IPO’s who were much larger, they outperform their respective matching firms in the long run. The opposite direction of these results highlights the structural differences. Unfortunately these two exchanges are the best comparison since they are both US based and the two largest sized exchanges in the world.

Looking at the returns of the NYSE compared the NASDAQ, we find that over the three-year long run they perform better in terms of returns as well as wealth relatives. This indicates that companies who went public during this time period of 2002-2010 performed better over the long run if listed on the NYSE when compared by market cap size. This suggests that those IPO companies on the NYSE who have larger market caps tend to be less overvalued than the larger market cap IPO’s on the NASDAQ.

### **C. Performance in Relation to Age**

Tables 3 and 4 use age of the firm, three-year average B&H returns and wealth relatives to give insight on the performances of younger companies to older companies and their returns. Ritter (1991) believes that there is a strong relation between age of a company and the aftermarket performance of an IPO. He attributes this strong relation to over optimism and believes that younger IPO's have more long run underperformance. Also Carter, Dark and Singh (1998) believe that older firms should be less risky than younger firms. When separating the NASDAQ and NYSE, we find that in the NASDAQ sample, the youngest firms have a higher long term return than the matching firms. While in the NYSE, the younger firms have a lower long-term return than their matching firms. This indicates that the youngest companies in the NASDAQ outperform while in the NYSE, the youngest firms underperformed.

For the NASDAQ sample, this provides contradictory evidence to Ritter's belief and Carter, Dark and Singh (1998). In the NASDAQ sample, we find that only the youngest and oldest firms have long run over performance while the middle aged companies tended to have long run underperformance. This contradicts Ritter (1991) which may be attributed to the splits in our study. The NYSE had a higher mean wealth relative of 1 and the NASDAQ sample had a wealth relative of .95, which suggest that there is a smaller degree of underperformance or in this case no over or under performance in the NYSE than there is in the NASDAQ sample.

#### **Table 4. Age Classification on 210 NYSE IPO's and Matching Firms for 2002-2010.**

Age of each of these IPO's was found by taking information such as the offer year, date of foundation and date of incorporation from the SDC and Datastream databases. To find age of the company I took the difference between the year the company went public and the date of foundation. For those companies missing a date of foundation, date of incorporation was used in its place. In this table the Average three-year B&H Returns are found for both the IPO's and respective matching firms using the formula  $R_i = [\prod_{t=1}^3 (1 + R_{it}) - 1] \times 100\%$ . For each designated Age range a Wealth Relative was calculated using the formula

$$WR = \frac{(1 + \text{Avg. 3Yr. Holding Period Return of IPO's})}{(1 + \text{Avg. 3Yr. Holding Period Return of Matching Firms})}$$

<u>Age of Company</u>	<u>Number of IPO's</u>	<u>Three-Year B&amp;H Returns for IPO's</u>	<u>Three-Year B&amp;H Returns for Matching Firms</u>	<u>WR</u>
0-4	87	0.29	0.32	0.98
5--9	39	0.01	0.08	0.94
10--14	26	0.47	0.32	1.12
15+	58	0.4	0.47	0.95
<b>Mean</b>		<b>0.29</b>	<b>0.30</b>	<b>1.00</b>

**Table 5. Three-Year Average Buy and Hold Return Results for the 391 NASDAQ IPO's and respective Matching Firms in the years of 2002-2010.**

The Total Return Index prices were found for each individual IPO and Matching Firm for 36 months after the IPO date of a firm from the Datastream database. The Total Return Index was used because it accounts for dividends and stock splits. The 36 months prices were then calculated by repeating the formula of  $(p_2 - p_1) / p_1$ . After the returns were calculated the formula of  $R_i = [\prod_{t=1}^{36} (1 + R_{it}) - 1] \times 100\%$  was used in order to find the 3Yr. Buy and Hold Returns for each IPO. The same process was performed for its respective Matching Firm, which was matched based off Market Capitalization. For the IPO's that had missing returns due to delisting's or mergers, the returns were truncated<sup>2</sup> from that monthly date onward. Also the respective Matching Firm's returns from that month onward were truncated. Averages then were taken of all the IPO and Matching Firms three-year Buy and Hold Returns to arrive at the final 3Yr. Avrg. B&H Return. To calculate the Abnormal Return it was found by  $r_{IPO} - r_{Matching}$  Firm. Both the  $r_{IPO}$  and  $r_{Matching}$  Firms returns were the total returns. In order to find the Wealth Relative for the entire sample the formula below was used.

$$WR = \frac{(1 + \text{Avrg. 3Yr. Holding Period Return of IPO's})}{(1 + \text{Avrg. 3Yr. Holding Period Return of Matching Firms})}$$

Average Three-Year B&H Total Return on NASDAQ IPO's	<b>15%</b>
Median NASDAQ IPO Three-Year B&H Return	<b>-21%</b>
The Highest Return out of the NASDAQ IPO's	<b>1562%</b>
The Lowest Return of the NASDAQ IPO's	<b>-99.991%</b>

<sup>2</sup> Truncating is the process of shortening or calculating returns from a certain point.

Average Three-Year B&H Total Return on NASDAQ Matching Firms	19%
Median NASDAQ Matching Firm Three-Year B&H Return	-8%
The Highest Return out of NASDAQ Matching Firms	1867%
The Lowest Return out of NASDAQ Matching Firms	-99.967%

Three-year Average NASDAQ Abnormal Return	-4%
Three-year Wealth Relative of NASDAQ IPO's to NASDAQ Matching Firms	0.96

**D. Three-Year B&H Results and Performance**

Tables 5 and 6 describe the NASDAQ IPO, NASDAQ matching firms, NYSE IPO's and NYSE matching firms' performance for the sample sizes. In the NASDAQ sample of 391 IPO's we find that the IPO's average three-year buy and hold return is 15%, while the matching firms three-year buy and hold is 19%. This means that IPOs have a lower return compare to the matching firms over the long run. The wealth relative of 0.96 indicates that the IPO's underperforms in the long run and is consistent with past literature like Ibbotson and Jaffe (1975), Ritter (1991), Loughran (1993) and Carter, Dark and Singh (1998). The median for the three-year returns on the NASDAQ IPO's was -21%. This is quite a low number and we find that 227 of the IPO's three-year returns were actually negative. This means that there is a 58% chance that an IPO over the course of the next three-years would yield you negative returns. From an investment perspective these are not good odds and more closely resemble the odds in a casino.

In comparison to the results of the NASDAQ matching firms, we find that the returns on 220 of the NASDAQ matching firms are negative which implies that there is a 56% chance that a matching firm would yield you a negative return over the course of three-years. This again ironically resembles a gamble versus investment. These results only verify the utmost importance of performing due diligence on firms before placing your money in the markets. This finding suggests that although the IPO's may have unperformed compare to matching firms, it would not make a big enough difference from an investment perspective if you choose an IPO or a non IPO company. The highest return in the NASDAQ IPO sample had an amazing 1,562% return, but comparably the lowest return was -99.991% or in basic terms an ultimate failure. The NASDAQ matching firms also provide a similar pattern with the best company having a return of 1,867% and the worst company having a -99.97% returns. This suggests the choice of picking an IPO or non-IPO to invest in does not give you a substantially better chance of one over the other.

**Table 6: Three-Year Average Buy and Hold Return Results for the 210 NYSE IPO's and respective Matching Firms in the years of 2002-2010.**

The Total Return Index prices were found for each individual IPO and Matching Firm for 36 months after the IPO date of a firm from the Datastream database. The Total Return Index was used because it accounts for dividends and stock splits. The 36 months prices were then calculated by repeating the formula of  $(p_2 - p_1) / p_1$ . After the returns were calculated the formula of  $R_i = [\prod_{t=1}^{36} (1 + R_{it}) - 1] \times 100\%$  was used in order to find the 3Yr. Buy and Hold Returns for each IPO. The same process was performed for its respective Matching Firm, which was matched based off Market Capitalization. For the IPO's that had missing returns due to delisting's or mergers, the returns were truncated from that monthly date onward. Also the respective Matching Firm's returns from that month onward were truncated. Averages then were taken of all the IPO and Matching Firms three-year Buy and Hold Returns to arrive at the final 3Yr. Avrg. B&H Return. To calculate the Abnormal Return it was found by  $r_{IPO} - r_{Matching Firm}$ . Both the  $r_{IPO}$  and  $r_{Matching Firm}$  returns were the total returns. In order to find the Wealth Relative for the entire sample the formula below was used.

$$WR = \frac{(1 + \text{Avrg. 3Yr. Holding Period Return of IPO's})}{(1 + \text{Avrg. 3Yr. Holding Period Return of Matching Firms})}$$

Average Three-Year B&H Total Return on NYSE IPO's	29%
Median Three-Year NYSE Returns on IPO's	16%
Highest Return on NYSE IPO's	389%
Lowest Returns on NYSE IPO's	-99.94%

Average Three-Year B&H Total Return on NYSE Matching Firms	32%
Median Three-Year Returns on NYSE Matching Firms	17%
Highest Return on NYSE Matching Firms	633%
Lowest Returns on NYSE Matching Firms	-99.95%

Three-year Average Abnormal NYSE Return	-2%
Three-year Wealth Relative of NYSE IPO'S to NYSE Matching Firms	0.98

The medians the results for the NYSE IPO's and NYSE matching firms were almost identical at 16% and 17% respectively. Out of 210 NYSE IPO's eighty-eight of them had negative returns over the three-year long run and for the NYSE matching firms eighty-one had negative returns. This suggests a chance of 42% and 39% respectively that investing in either would give a negative return over the three-year long run. These are much better odds in comparison to the NASDAQ IPO's and NASDAQ matching firms. In the NYSE IPO sample, the highest return yielded 389% and in the NYSE matching firms the highest return yield 633% and the worst returns in each category they had a -99.94% and -99.95 % respectively.

When comparing the NASDAQ and NYSE against each other we found distinct areas of differences. We found that the NYSE performed better in most results, including IPO's and matching firms. The NYSE had higher average three-year buy and hold returns, higher median three-year returns and a higher wealth relative of 0.98 compared to 0.96 on the NASDAQ indicating that the NYSE IPO's had less underperformance than the NASDAQ IPO's did. In the performance of highest returns, the NASDAQ had a better result than the NYSE, which could be a result of the exchange characteristic differences in the NASDAQ being more growth orientated and the NYSE being more value orientated. Our overall findings from these results is that in the long run IPO's underperform their respective matching firms, the NYSE underperforms less than the NASDAQ comparably and that companies on the NYSE or companies that went public on the NYSE during the time period would be a better place to place your bets.

**Table 7: Ordinary Least Squares Regression Equation for NASDAQ IPO'S 2002-2010.**

$$\ln 3YrReturn_i = b_0 + b_1 \ln MrktCap_i + b_2 \ln Proceeds_i + b_3 \ln Age_i + b_4 BTM_i + b_5 MarketCRSP_i + b_6 Underwriter_i + b_7 VC_i + e_i.$$

ln 3Yr Return is the natural log of the three-year return, which was calculated from the first month closing price to its exact 36-month closing price. lnMrktCap is the natural log of the Market Caps of the IPO's at the date they went public and was found in the SDC and Datastream databases or by using (price x number of shares outstanding). lnProceeds is that natural log of gross proceeds that were received from the company's IPO. This information was found from either SDC or Datastream databases. lnAge is the natural log of the age of the company that went public. Age of each of these IPO's was found by taking information such as the offer year, date of foundation and date of incorporation from the SDC and Datastream databases. BTM is the book to market value of each IPO found by the inverse of the Market to Book Value. This variable was winsorized. MarketCRSP is the value weighted index market adjusted returns of the NASDAQ for the same time periods as the IPO's. Underwriter is a dummy variable in which firms that were considered "Bulge Bracket" received a 1 and those who were not received a 0. VC is a dummy variable in which those IPO's that had a Venture Capital Backer received a 1 and those who did receive a 0.

<b>Variable</b>	<b>Coefficient</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>t-value</b>	<b>p-value</b>
<b>ln3YrReturn</b>		-0.442	1.373		
<b>lnMrktCap</b>	-0.369	19.390	0.776	-2.15	0.032
<b>lnProceeds</b>	0.608	18.110	0.748	3.52	0.000
<b>lnAge</b>	0.020	2.184	0.891	0.27	0.787
<b>BTM</b>	-0.069	0.492	0.613	-0.60	0.549
<b>MarketCRSP</b>	1.486	0.182	0.291	6.62	0.000
<b>Underwriter</b>	0.016	0.554	0.498	0.10	0.921
<b>VC</b>	-0.082	0.529	0.500	0.55	0.581
<b>Constant</b>	-4.550			-2.22	0.027
<b>R-Squared</b>	0.1410				
<b>Adj. R-Squared</b>	0.1252				

**Table 8: Ordinary Least Squares Regression Equation for NYSE IPO’S 2002-2010.**

$$n3YrReturn_i = b_0 + b_1 \ln MrktCap_i + b_2 \ln Proceeds_i + b_3 \ln Age_i + b_4 BTM_i + b_5 MarketCRSP_i + b_6 Underwriter_i + b_7 VC_i + e_i.$$

ln3YrReturn is the natural log of the three-year return, which was calculated from the first month closing price to its exact 36-month closing price. lnMrktCap is the natural log of the Market Caps of the IPO’s at the date they went public and was found in the SDC and Datastream databases or by using (price x number of shares outstanding). lnProceeds is that natural log of gross proceeds that were received from the company’s IPO. This information was found from either SDC or Datastream databases. lnAge is the natural log of the age of the company that went public. Age of each of these IPO’s was found by taking information such as the offer year, date of foundation and date of incorporation from the SDC and Datastream databases. BTM is the book to market value of each IPO found by the inverse of the Market to Book Value. This variable was winsorized. MarketCRSP is the value weighted index market adjusted returns of the NASDAQ for the same time periods as the IPO’s. Underwriter is a dummy variable in which firms that were considered “Bulge Bracket” received a 1 and those who were not received a 0. VC

is a dummy variable in which those IPO's that had a Venture Capital Backer received a 1 and those who did not received a 0.

<b><u>Variable</u></b>	<b><u>Coefficient</u></b>	<b><u>t-value</u></b>	<b><u>p-value</u></b>	<b><u>Mean</u></b>	<b><u>Standard Deviation</u></b>
<b>In3YrReturn</b>				-0.104	1.171
<b>InMrktCap</b>	-0.057	-0.36	0.718	20.413	0.904
<b>InProceeds</b>	0.105	0.62	0.538	19.331	0.778
<b>InAge</b>	0.030	0.47	0.640	1.921	1.321
<b>BTM)</b>	0.045	0.18	0.857	0.570	0.373
<b>MarketCRSP</b>	1.180	4.29	0.000	0.259	0.292
<b>Underwriter</b>	0.133	0.54	0.588	0.862	0.346
<b>VC</b>	0.291	1.09	0.276	0.105	0.310
<b>Constant</b>	-1.520	-0.72	0.473		
<b>R-Squared</b>	0.1008				
<b>Adj. R-Squared</b>	0.0697				

### **E. NASDAQ and NYSE Regression Results**

Tables 7 and 8 provide regression results for the NASDAQ and NYSE using an Ordinary Least Squares model. The dependent variable that is used in each regression is the total three-year raw returns of my IPO's for each corresponding exchange. The independent variables our independent include market capitalization, gross proceeds from the offer, age of the firm, book to market value, CRSP Value Weighted Index returns of NASDAQ and NYSE and two dummy variables being the underwriter and venture capital backing. For the book to market value, we winsorized the results to account for extreme values. This was done at the 99% level.

The NASDAQ and NYSE Value Weighted Index returns were find, calculated on a monthly basis and assigned to an IPO for the specific date range that the IPO had. We use a dummy variable to measure the lead underwriter so that any of the IPO's that were taken public by



underwriters who were considered “Bulge Bracket” were assigned a one and any IPO that was taken public by an underwriter that was “Non Bulge Bracket” was given a zero used as a proxy for underwriter prestige. For IPO’s that had venture capital backing they were assigned a one and for the IPO’s who did not have venture capital backing they were assigned a zero. In Table 11 the NASDAQ IPO regression had an adjusted coefficient of determination of 12.52%. This adjusted R-squared is relatively low for predicting the fit of the model as an R-squared of 100% would mean that the models fit is perfect. Nevertheless, looking at each individual independent variable, we find that  $\ln$  Mrkt Cap,  $\ln$  Proceeds and Market CRSP are statistically significant which is consistent Ritter (1991) and Carter, Dark and Singh (1998).

## **5. CONCLUSION**

Throughout the study we have tested and compared different performance measures of the NASDAQ and NYSE separately to try to give a deeper analysis of the long-term performance of IPO’s on each exchange. We ran two major tests, one being a computation of three-year B&H returns which we used to calculate wealth relatives. These wealth relatives gave me a quantifiable measure to distinguish under or over performance in the long run of IPO’s. For the NASDAQ IPO’s we find that in the three-year long run, based off its overall three-year wealth relative of 0.96, median of -21%, mean wealth relative for gross proceeds of 0.94 and mean wealth relative for age of 0.95 that the NASDAQ IPO’s underperform more than the NYSE IPO’s which had an overall three- year wealth relative of 0.98, median of 16%, mean wealth relative for gross proceeds of 0.99 and a mean wealth relative for age at one. Also based off the computations of wealth relatives mostly all being below one, signifies that both the NASDAQ and NYSE IPO’s underperformed compared to their respective matching firms, which were matched on market capitalization size.

These findings are consistent with Ritter (1991), Loughran (1993), Ritter and Loughran (1995), Brav and Gompers (1997) and Carter, Dark and Singh (1998) that IPO’s in the long run underperform. Where we found differences in the findings than past literature was in breaking down these two exchanges separately we found that certain variables such as age differed in the fact that for the NASDAQ IPO’s the younger firms tended to outperform the set of matching firms. This evidence is contradictory to the beliefs of Ritter and Loughran who believed that older firms should be less risky and therefore perform better in the long run. The second major test we used was an Ordinary Least Squared regression model in which we regressed seven independent variables against the three-year total raw returns of each exchange.

Our finding suggests that both the adjusted R-squared are quite low, but consistent with past literature numbers. We also found statistically significant coefficients for the NASDAQ in  $\ln$ MrktCap,  $\ln$ Proceeds and Market CRSP. As for the NYSE however, we only had one significant

explanatory variable which was Market CRSP. Due to results that we found in the study, we can accept both of the hypotheses posed. The first being that the NASDAQ IPO's would underperform compared to the NYSE IPO's, and the second hypothesis that both the NASDAQ and NYSE IPO's would underperform compared to their respective matching firms. Shortcomings of the study that are present as follows: It has been shown that long term performance does not end at three-years, Loughran (1993) proved in his study that underperformance can increase as time increases up till five or six years after the IPO. Another limitation is that only one type of way to measure the long-term performances was tested. Besides calculating wealth relatives another method that has been used in past literature is by creating portfolios and doing monthly rebalancing to those portfolios. From this point, further research can be done on the shortcomings of my work using the same sampling method, time period of 2002-2010 and separation of the NYSE and NASDAQ exchanges. A final approach for future research could be to test the returns with equal weighted returns instead of valued weighted returns. In regards to IPOS's overall. we would recommend anyone who is interested in buying shares of an IPO to conduct extreme due diligence on the IPO before placing your money in an IPO. If you are a long term investor, evidence shows that investing in NYSE IPOS would be a better place to place your bets than in NASDAQ IPOS.

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