

IMPACT OF INVESTORS SENTIMENT ON IPO PERFORMANCE: EVIDENCE FROM NASDAQ AND NYSE

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ABSTRACT

Purpose- The paper explores the correlation between investors' sentiment, underpricing and performance over a period of 36 months of newly issued American stocks with a sample of 199 newly listed firms on NASDAQ and NYSE within the period of January 2015 to April 2021. IPOs listed on US stock exchanges have received little attention even though anomalies related to new stock issues are well documented. We aim to fill the existing academic gap.

Methodology- We have hypothesized investor sentiment as the potential explaining variable inducing the anomalies observed and we extract this variable from the American Association of Individual Investors¹ survey results per the nearest date of each IPO issue. We compute the returns in two separate timeframes. The Market Adjusted Initial Returns (MAIRs) are computed as the price change observed during the offer day, adjusted to the S&P500 index. We investigate long-term performance by calculating the Buy-and-Hold Abnormal Return (BHARs) of each IPO for a period of 36months. The company characteristics, which are age, proceeds, number of issued shares, venture capital backing status and economic sector, are retrieved from Thomson Reuter's screens to control on IPO pricing. Then we use a regression model to see whether the predictor variable has an effect on the outcome variable.

Findings- We found that the correlation between the bullish ratio and the MAIRs confirms results found in previous literature and no relationship between investor sentiment and long run performance have been observed.

Conclusion- We conclude that on American stock markets, the existing underpricing can be explained by investors overreacting to new issues while findings relative to the long run performance contradict earlier research, as there is no evidence of underperformance among companies that went public between January 2015 and April 2021. Further research can be oriented toward understand why the documented poor performance related to IPOs no longer exists, as well as the particular characteristics of US markets which are favorable to the profitability of the new issues in the long-term.

Keywords: Investor sentiment, behavioral finance, long-term performance, underpricing, initial public offering, IPO.

JEL Codes: D91, G10, G41

1. INTRODUCTION

In traditional finance theory, investor sentiment has no place. Investors are assumed rational; therefore, they diversify their portfolios to improve the performance parameters of their investments. Price levels match the rationally discounted value of predicted cash flows, and expected returns depends on systematic risks because of competition among them (Baker and Wurgler, 2003). In other words, traditional finance theory implies that individuals make decisions by obtaining all relevant information and have the abilities to analyze this information rationally and unemotionally in order to make the best decisions. It is based on the concept of an idealized perfectly rational individual who has infinite access to knowledge, is capable of accurately interpreting all signals, and makes the best decisions based on impartial perspective and prediction of future events (Szyszka, 2013).

Contradicting the common sense of traditional finance, this paper explores the correlation between investors' sentiment, underpricing and performance over a period of 36 months of newly issued American stocks with a sample of 199 newly listed

¹ AAI Investor Sentiment Survey: <https://www.aaii.com>

firms on NASDAQ and NYSE within the period of January 2015 to April 2021. In fact, scholars have demonstrated interest in exploring the underlying factors inducing IPOs to be underpriced and present poor returns in the long term. Authors discovered that the anomalies are observed worldwide extending to global financial markets. Studies tend to focus on emerging markets while developed economies such as the United States received little attention. This justifies the focus of our paper, instigating the well-known anomalies related to IPOs restricting to American stock markets.

Traditional finance failed to explain this recurring phenomenon, and it is for this reason that researchers turned toward behavioral finance. In this paper, the stock market for newly listed companies has been chosen, as it is a good place to look at the impact of sentiment investors on company prices. By definition, issuing companies are young, immature and fail at providing historical price performance. Consequently, it is unsurprising that they are difficult to value and market participant often have a wide variety of priors when it comes to their valuation. They are more likely to be affected by market sentiment as individuals are relying on their personal valuation biases.

The literature analysis in part two highlights the theories developed by previous scholars building the foundation of IPO underpricing and long-term underperformance, along with several theories for why stock prices rise dramatically on the offer day while providing lower long-term profits. The following sections include, first the previous literature found on IPOs underpricing and long run underperformance. Next is presented the dataset and methodology employed to further make our analysis, followed by the findings and discussion. A concluding section is presented at the end of the paper.

2. REVIEW OF LITERATURE

2.1. IPO Underpricing

Initial Public Offering (IPO) underpricing occurs when listed shares are priced at a value inferior to their market value. The phenomenon has attracted the attention of many researchers since 1836. It has been continuously explored since then empirically and theoretically. IPOs tend to be underpriced all over the world and the anomaly is not associated with a particular time of issue or geographical location of the company. Asymmetry of information and behavioral theories have been linked to the above-mentioned phenomenon.

Before diving into the background of the study and further theories behind common characteristics related to IPO, it is interesting to mention reasons why companies go public in the first place. Kim and Weisbach (2005), based on a study of 16,958 IPOs from 38 countries, argue that capital raising is the most important motive for companies to issue an IPO. They also point out that the amount of money raised is mainly spent on inventory, research and development, plant and equipment and net property, suggesting that companies use raised capital for investment purposes. Furthermore, Pagano, Panetta and Zingales (1995) note that, in addition to lowering the cost of debt, going public has a value-maximizing incentive by facilitating firms to be sold at a higher price. In fact, the high notoriety and media coverage of companies going public for the first time tend to attract executives with recognition and provide them with a higher bargaining power over their vendors, credit institutions and distributors. However, as earlier researchers have noted, issued shares are generally priced at a discount, and issuing firms frequently give up on some amount of profit to the benefit of initial investors who receive positive first-day returns. The phenomenon is extensively studied and known as IPO underpricing. Now, exploring the reasons for it to occur we mention asymmetry of information, specifically winner's curse and theories based on quality signals between the players involved in an IPO transaction.

2.1.1. Theory of Winner's Curse

Scholars defined winners' curse by the act of overbidding an item in the aim of winning it, but with the risk of exceeding its intrinsic value (Lahti, 2021). Rock (1986) has produced the most quoted paper based on Akerlof's (1970) lemons dilemma, claiming that the underwriting institution and issuing firm dispose of a wider range of information compared to other parties involved. The asymmetry of information even extends to the potential investors themselves. Therefore, better-informed investors tend to only bid for attractively priced IPOs while avoiding unattractive ones. As for the uninformed investors, they bid indiscriminately. The fact that uninformed investors are unable to absorb all the shares issued forces companies to resort to underpricing to incite informed investors to bid for the offered shares even though they find them unattractive. It is also useful for uninformed investors since they will not end up with negative return. Hens and Schenk-Hoppe (2009) mention the fact that firms might exploit the herding behavior of traders by inducing a positive cascade of information, which might lead to winner's curse phenomenon. In fact, "the low prices (of IPOs) induces early adoptions" causing a herding behavior among other traders who will buy the IPO afterwards. The winner's curse model of Rock (1986) basically, turns on information asymmetry and According to Michaely and Shaw (1994), as the heterogeneity of information approaches zero, the winner's curse fades and underpricing is no longer necessary.

2.1.2. Signaling Firm's Quality through Underpricing

Previous studies have also documented theories going against previously mentioned scenario and assuming that companies underprice their IPO to convey the firm's "real" high value (Ljungqvist, 2007). The strategy will allow companies to return to the market later on to sell equities at a higher price. As Ibbotson (1975) said, "leave a good taste in investors' mouths", underpriced shares will allow companies to demonstrate their high potential.

2.1.3. Behavioral Theories

Previous hypotheses have been inconsistent in describing market peaks and large amounts of money given up on throughout history. According to Ljungqvist (2007), issuing firms left \$62 billion on the table in a one-year period (1999-2000), leading several experts to question whether asymmetry of information-related theories could explain such a large scale of underpricing. To find relevant theories shedding light on the observed phenomenon studies on behavioral finance debuted to expand. "Behavioral finance studies the psychological factors that influence financial behavior both on the level of the individual as well as on the level of the market" (Hens & Bachmann, 2011). Turning to the behavioral hypotheses, it is assumed that there are irrational traders willing to bid for overly higher prices that go beyond the intrinsic value of the stock, or that issuers are biased in evaluating the true value of their offerings (Ljungqvist, 2007). In this paper, irrational investors called sentiment investors will be our focus in explaining underpricing and long-term underperformance observed. Investor sentiment is defined as the financial market traders' general attitude with regard to the value and potential future returns of a financial instrument founded on their emotional and cognitive biases (Cathy, 2008). Wang, Rieger, & Hens (2017) investigated the effect that culture has on loss aversion. Moreover, while culture is deemed to shape the emotions of investors, the authors, after analyzing results from 53 countries, found that cultural differences influence investment decision-making of market participants.

Market timing is another theory explored and defined as the strategy of selling or buying financial instruments in the attempt of outperforming the market. In other words, market timing is considered as the investor's ability to profit from price reversals using technical or/and fundamental analysis to predict price movements. This can induce higher number of deals and returns on the market (Montier, 2003). Lowry (2003) suggests that, after studying a sample of 5349 IPOs that high IPO volumes are triggered by high investor optimism. She notes that firms that go public during high-volume periods do not appear to be mispriced compared to other similar companies; it appears that these firms successfully go public when their entire sector is overvalued. Schill (2000) finds similar results. Hens and Benli (2021) report that in times of crises and high uncertainties, investors tend to exhibit adaptive behaviors, panic selling and guilt. They observe higher activities of investment and disinvestment making market timing possible for investors that are more rational. Market sentiment plays an important role when companies are making the decision of going public.

2.2. Long-term Performance

In addition to be characterized as underpriced following the offer, IPOs present long-term poor performance as a familiar pattern. Theories behind the phenomenon are not as elaborate as for the underpricing and results from previous research are controversial (Tomadakis et al. 2012). According to Ritter (1991), exceptionally high prices shortly after the company issues its first stock are accompanied with disproportionately poor long-run returns. The described pattern, as per Ritter and Welch (2002), is especially prominent during "hot market" conditions. They argue that individual traders' overconfidence may account for the well-documented price rises that occur when dealing with newly issued stocks, as well as the dismal returns that follow in the first few years of trade. According to Ritter (1991), some of the underpricing can be attributed to markets participants overreacting to upcoming Initial public offerings. Companies, on the other hand, are more likely issue their first stock when market sentiment tends toward higher growth and profit expectations and are willing to pay excessive larger amounts based on unrealistic estimates.

2.3. Related Studies

Cornelli et al. (2004) investigated the role of grey market investors (representing the investor sentiment) on the price of IPO by using over-the-counter market price data of a wide range of European new stock issues from 1995 to 2002 shedding light on the issue of underpricing. The authors observe that when investors are overconfident, aftermarket prices are high because they are ready to pay a premium over the IPO's underlying worth. In addition to that, they observe that long-term returns and grey market prices are negatively correlated. They also discover that rational investors perceive investor sentiment and benefit from it by selling the shares to them when they are optimistic in the aftermarket. In accordance with the previously cited authors, Xian (2021) found similar results, concluding that optimistic sentiment leads to a higher post-IPO turnover, implying the sale of overpriced IPO shares to exuberantly optimistic investors.

Similarly, Derrien (2005) investigated the relationship between investor sentiment and IPO pricing from 1999 to 2001. The author created a model and tested it on a sample of 62 initial public offerings (IPOs) registered on the French stock exchange.

He concluded that the demand of individual investors is strongly correlated with the market condition and that they have an impact on IPO price. IPO shares are overpriced when investor sentiment is more favorable. Moreover, he noted a positive correlation between their demand and initial returns and turnover, as well as a negative correlation with the long run IPO performance.

Bajo and Raimondo (2017) contributed to the literature on the relationship between finance and media. They gathered information from 2814 initial public offerings (IPOs) and 27,309 published works in US periodicals. They employed textual analysis to formulate a mathematical equation describing the sentiment tone of the publications. They discovered that a positive tone influences considerably the degree to which IPOs are underpriced. According to the study, an increase in the standard deviation in tone by one accounts for a 2.5% increase in the level of underpricing.

In the same spirit, DN Rathnayake et al. (2019) used a dataset comprising 148 CSE Initial public offerings from 1991 to 2017 and collected data from companies' annual financial statements and the official website of CSE to find that IPOs had a level of underpricing of 47% and 32 of the them were overpriced by 17–18%. The correlations between initial returns and several independent factors were investigated using the Ordinary least square method and a cross-sectional study. The size of the issue, time lag factor, market sentiment, risk level, volatility of the market, as well as hot market conditions all have a major impact on offerings' profits, according to the researchers. According to the authors, average overpricing is also a problem.

3. DATA AND METHODOLOGY

This section sheds light on the data used and the methodology we aim to employ in order to conduct our analysis.

3.1. Hypothesis Definition

This empirical study, investigating the impact of investor sentiment on US IPOs listed on NASDAQ and NYSE underpricing and long run performance tests, two hypotheses;

H₁⁰: Investor sentiment ratio does not have an impact on IPOs' market adjusted initial returns.

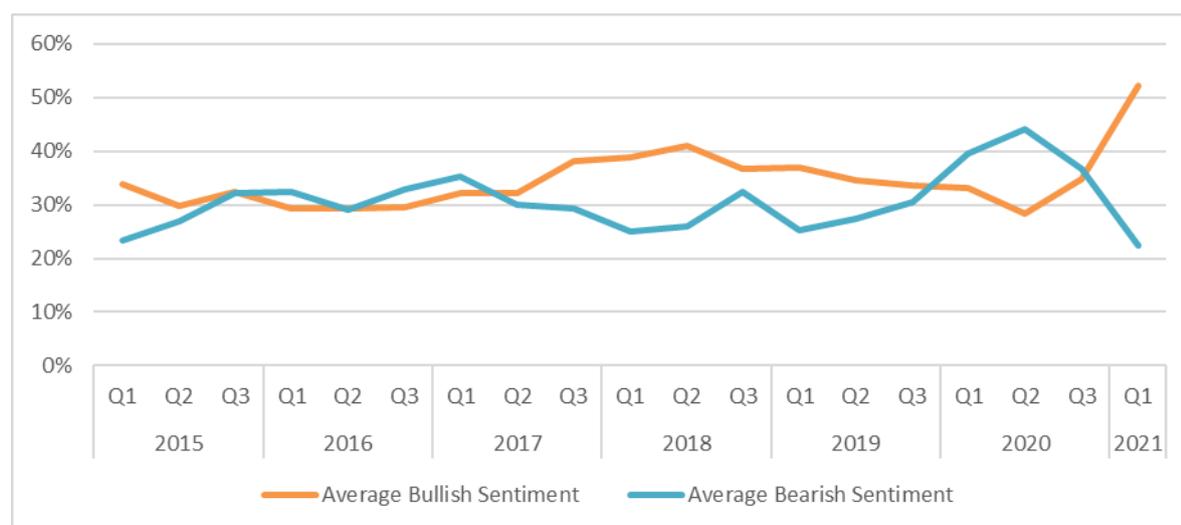
H₂⁰: Investor sentiment ratio does not have an impact on IPOs' long-term performance.

3.2. Data and Variables Definition

3.2.1. Investor Sentiment

Investor sentiment ratios have been extracted from the AAll website administering direct surveys and conducting monthly publications. Investors' bullishness and bearishness levels on the week within which the IPOs have been issued are added to the IPOs' information. Below we present, in Figure 1, the evolution of the market sentiment throughout our study period, which is 2015 to the first quarter of 2021. The market sentiment remains bullish from the second quarter of 2017 to the end of 2019 while the bearish sentiment prevails from the second quarter of 2015 to the end of the first quarter of 2017. We note a more bearish sentiment during the year of 2020 and an overtaking bullish sentiment at the beginning of 2021.

Figure 1: Average Bullish and Bearish Sentiment



3.2.2. IPO Data and Control Variables

Following the selection criteria documented by previous studies: DN Rathnayake et al. (2019), Lowry (2003), Derrien (2005), Bajo, Raimondo (2017), IPO data have been extracted from Thomson Reuters' database. We select US IPOs and exclude REITS, unit IPOs, utility and financial firms, IPOs backed by private equity through LBOs, IPOs with offer price lower than 5\$, in-progress, postponed, canceled and foreign IPOs are excluded. We further filter out by security type, including only common and ordinary shares. A number of 378 US IPO listed on NASDAQ and NYSE for the period of January 2015 to April 2021. We, then, unselect shares that have been unlisted before the end of our period. The final sample contains 199 IPOs. For each IPO we have collected the name, foundation date, ticker symbol, industry and the stock exchange on which it has been listed. Furthermore, offer characteristics for each IPO have been collected in order to compute the Market Adjusted Initial Returns (MAIR) and the Buy-and-Hold Abnormal Returns (BHARs).

Focusing on isolating the effect of investor sentiment on the performance on newly issued stocks, other factors have to be controlled. First we have the proceeds generated, representing the size of the company. Second, the age of the firms have been collected following the remarks of Chambers and Dimson (2009) about older companies having lower underpricing levels compared to the younger ones that present higher levels of risk. Next, we have the number of outstanding shares, which represent the supply of the Initial Public Offering, and is a pricing factor as well. Furthermore, we create dummy variable to identify venture capital backed and belonging to high-tech industry firms. Lee and Wahal (2004) demonstrate in their paper that VC backing and IPOs level of underpricing are related. In their paper, the authors demonstrate that characteristics of the venture capitalists involved tend to reduce the degree to which IPOs are underpriced by reducing uncertainty with higher quality of monitoring. The same conclusions are made by Jahidur Rahman et al. (2021). Finally, we have IPOs belonging to a high tech industry, which are characterized by higher levels of risks and uncertainties, thus, higher underpricing levels (Loughran and Ritter, 2004). As noted more recently by Gregory et al. (2020), the documented impact of previously cited factors on IPO pricing should be controlled to isolate the effect of investor sentiment.

Table 1: Summary Variables

Dependent Variables	
MAIR	Market Adjusted Initial Return
BHAR	Buy and Hold Abnormal Return
Independent Variable	
Bullish	Bullish Ratio
Bearish	Bearish Ratio
Control Variables	
Age	Age of the firm
Ln_PROCEED	Ln of the total proceeds generated in all markets
LnNBShares	Ln of the number of shares offered
ECO SECTOR	Dummy Variable equals to 1 if the IPO belongs to a technology industry and 0 otherwise
VC_BACKED	Dummy Variable equals to 1 if the IPO is backed by Venture Capital 0 otherwise

3.3. Methodology

In the aim of investigating the first day price run-ups and long-term performance of IPOs, we compute the returns in two separate timeframes. The MAIRs are computed as the price change observed during the first day of trading taking the price at the end of the day and the price of the offering, we then adjust the proceed to the S&P500 index. We measure the performance over the long term by calculating the BHARs of each offering for a period of 36months. We also extract the market sentiment from the AAI survey results per the nearest date of each IPO issue. The company characteristics, which are age, proceeds, number of issued shares, venture capital backing status and economic sector, are retrieved from Thomson Reuter's screens to control their effect on IPO pricing. Then we use a regression model to see whether the predictor variable has an effect on the outcome variable.

3.3.1. Market Adjusted Initial Returns and Buy-and-Hold Abnormal Returns Calculations

Underpricing of IPOs is measured as the return made on the first day of trading. The formula below is used to obtain the initial raw returns of each IPO on the first trading day:

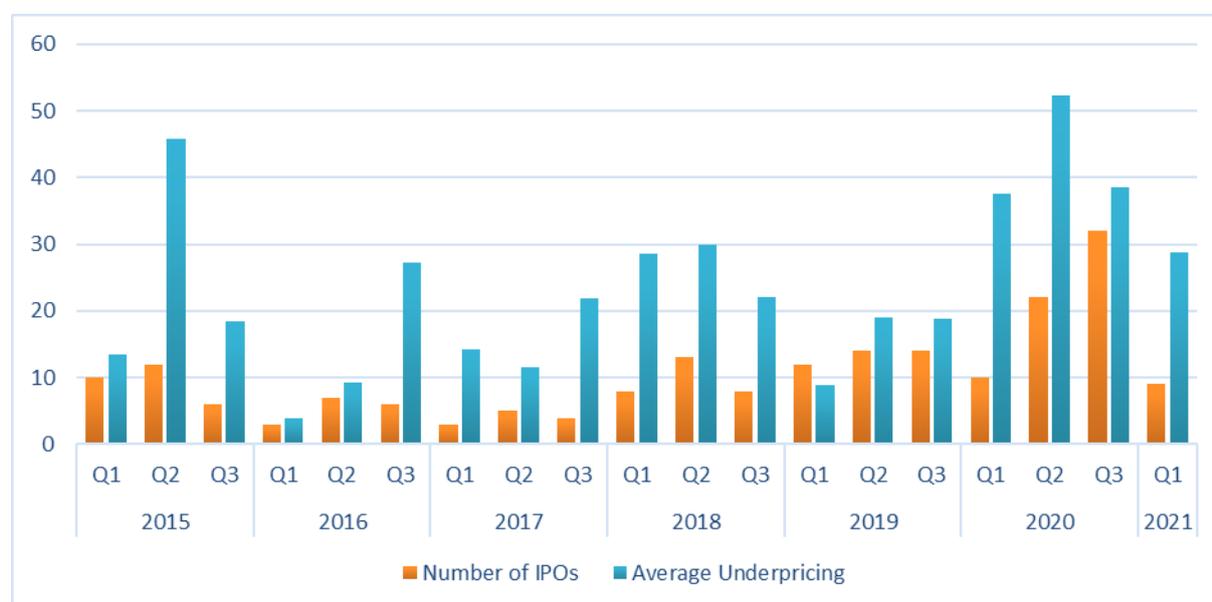
$$RIR_{i,t} = \frac{P_{i,1} - P_{i,0}}{P_{i,0}} \quad (1)$$

$P_{i,t}$ represents the price at the end of the first trading day, while $P_{i,0}$ represents the offer price. However, because the raw first returns do not account for general market movements, the prices must be modified using a benchmark index. The Market Adjusted Initial Returns are thus computed as follow:

$$MAIR_{i,t} = \frac{P_{i,1} - P_{i,0}}{P_{i,0}} - \frac{M_{i,1} - M_{i,0}}{M_{i,0}} \quad (2)$$

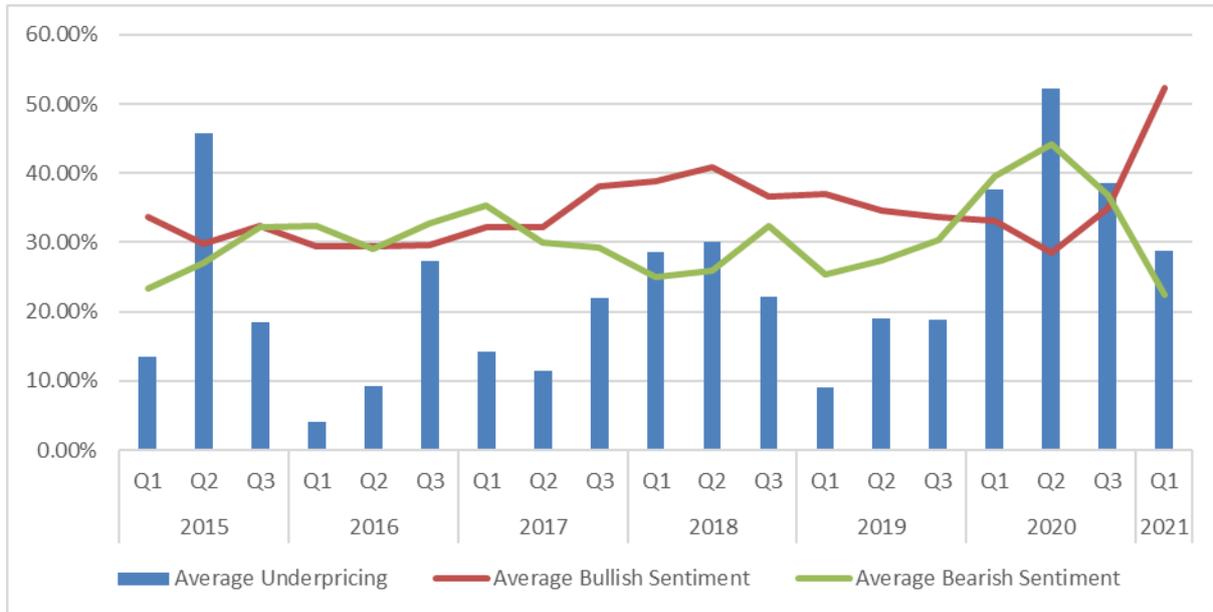
In the above equation, $M_{i,1}$ represents the equity index price at the conclusion of the offer day and $M_{i,0}$ is the index's most recent value prior to the first trading day. Because the data set in this research is heterogeneous, and the only common criteria that apply to the complete data sample are that the firms are US-based, and the IPOs were done on either the NASDAQ or NYSE stock market, I picked the S&P 500 index as a benchmark. The S&P 500 stock index is a capitalization-weighted index that contains the 500 largest and most powerful organizations in the United States, properly reflecting the common market movements in which the IPO sample companies operate (Lahti, 2021). The level of underpricing detected in our sample during the study period is depicted on the graph in Figure 2. The biggest number of initial public offerings (IPOs) were issued in the second quarter of 2020, when a record number of companies went public. In addition, the year 2020 was marked by a significant level of underpricing. The level of underpricing has remained below 30 since the peak in 2015.

Figure 2: Number of Quarterly Issues and Level of Underpricing



Combining the market sentiment and the level of underpricing we can observe on Figure 3 that during the period of 2015 to the beginning of quarter 2 of 2017, the bearish sentiment was mainly above the bullish sentiment ratios. The market was, on average, pessimistic with the expectations of failing prices. The level of underpricing beside the peak of 2015 Q2 remained low. From the end of quarter 2 2017 to 2019, the bullish sentiment is taking over and prevailing on the market. Higher level of underpricing is observed compared to the previous timeframe. Lastly, during 2020, we observe higher ratios of bearish sentiment. This corresponds to the Covid19 outbreak period. Fear, pessimism, panic and uncertainties related to global health crisis might explain the prevailing sentiment. The level of underpricing, however, is at its highest level. It starts to get lower as a more bullish sentiment is felt on the market at the beginning of 2021.

Figure 3: Level of Underpricing and Market Sentiment Data



Next, long-term performance is measured by the average BHAR. The BHAR, according to Barber and Lyon (1997), is a better measure of IPO stock long-term success than the Cumulative Abnormal Return (CAR), which is also used by early researchers. In addition to that, Lyon et al. (1999) suggest that the BHAR technique measures true experience of buying and holding the asset of individuals and is thus more essential in gauging IPO stock experience. However, BHARs tend to be positively skewed inducing a skewness bias to the long-term returns. A bootstrapped skewness adjusted regression test might allow us to reduce the risk of skewness bias and a more relevant analysis. The BHR of the IPO is calculated using the following formula:

$$BHR_{i,T} = \prod_{t=1}^T (1 + r_{i,t}) - 1 \tag{3}$$

T is the number of months, and $r_{i,t}$ is the stock's raw return for month t.

The market index return is determined in the same way. The BHARs, are calculated as follows, according to Kooli and Suret (2004):

$$BHAR_{i,T} = \left[\prod_{t=1}^T (1 + r_{i,t}) - 1 \right] - \left[\prod_{t=1}^T (1 + r_{m,t}) - 1 \right] \tag{4}$$

The return of the market index for the same period is $r_{m,t}$.

We illustrate the computed returns in Figure 4 presented below. Abnormal returns have been realized during the quarter 3 of the four years representing our study period as well as the quarter 2 of 2016 and quarter 1 of 2018. Negative returns and low performance compared to the market returns can also be observed on the graph. The overall performance of our IPO sample is slightly above the overall market returns with a holding period of 36 months.

Figure 4: Buy-and-Hold Returns of the IPO Sample, the Market Return and the Abnormal Return

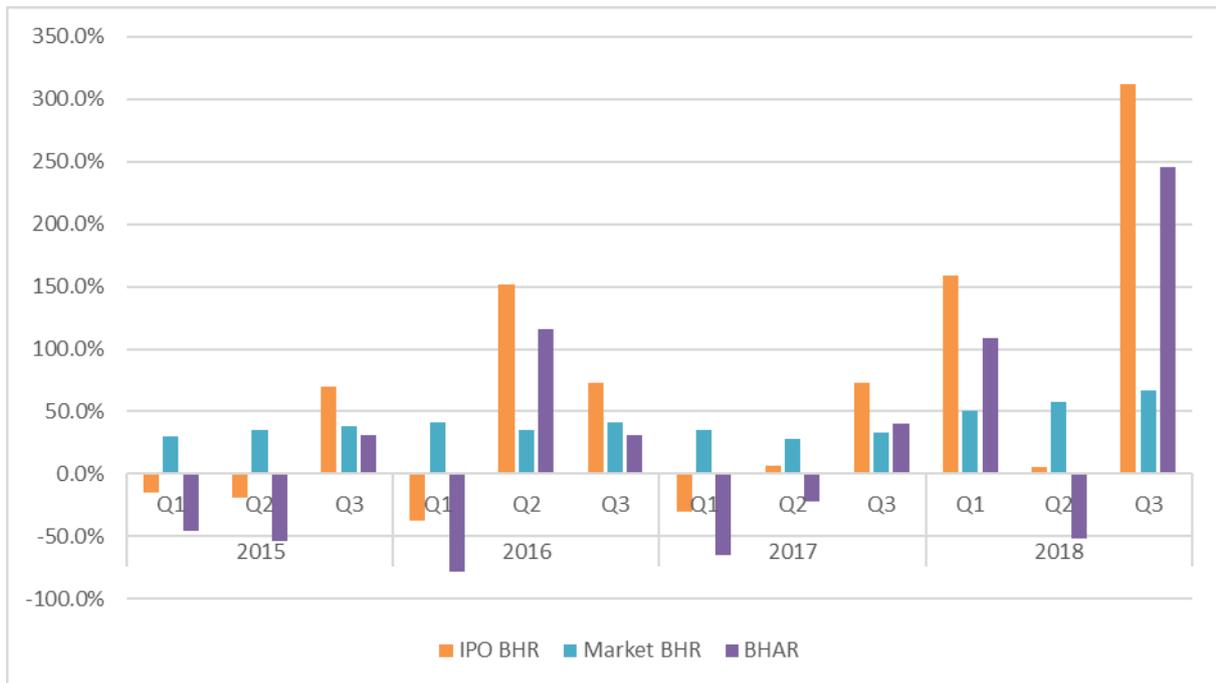
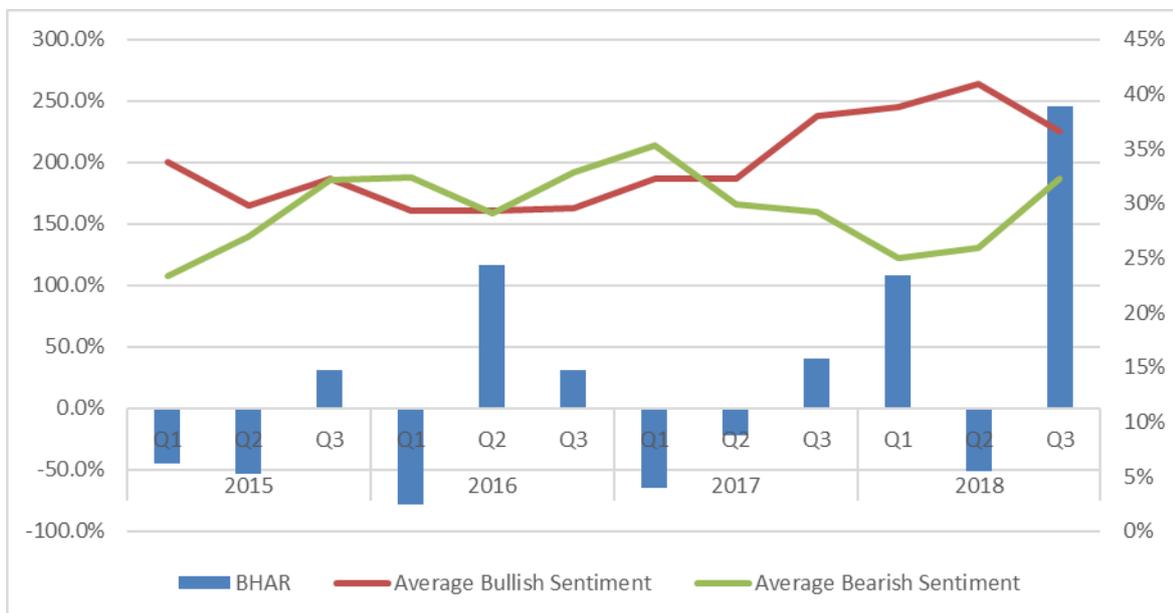


Figure 5 illustrates the quarterly values of Buy-and-Hold returns and the market sentiment for the period of 2015 to 2018. A clear pattern is not observed on the graph as to how the long-term performance of IPOs in the study sample correlate to the market sentiment.

Figure 5: Quarterly Buy-and-Hold Abnormal Returns and Market Sentiment



3.3.2. Regression Equation

Studies from previous scholars investigating IPO performance and behavioral explanations employ regression models to test the underlying hypotheses (see Liu, Zhang & Lyu, 2021; Hoechle, Karthaus & Schmid, 2020; Beck, 2017). After data collection, regression analysis is made through the Statistical Package for Social Sciences (SPSS). Prior to the regression analysis, multi-collinearity diagnostic has been made. Results tabulated in the following section are retrieved from SPSS. Descriptive statistics of our variables are also displayed on the system. The following formula presents the regression model used in this study:

$$Y_i = \beta_0 + \beta_1(\text{bullish}_{ratio}) + \beta_2(\text{bearish}_{ratio}) + X_i + \varepsilon_i \quad (5)$$

Where Y_i is defined as the predicted variable, which is the MAIR and will next be used to examine the behavior of the BHARs, X_i represents the control variables: Age, log of proceeds, log of the number of shares offered, high tech dummy, exchange dummy and VC backed dummy and ε_i is the error term.

4. RESULTS OF THE STUDY

Following data collection, the findings are presented in this section.

4.1. Univariate Analysis

4.1.1. Descriptive Statistics: Whole Sample

The table below displays the descriptive statistics of the studied variables. The mean Market Adjusted Initial return (MAIR) of our selected sample of 189 IPOs was 28.677%, the median value was 17.082%, and we noted a maximum value of 197.84% and a minimum of -30.838%. The standard deviation was 39.721. The average bullish ratio was 35.10% while for the bearish ratio it was 30.29%. Firms included in the sample have a mean age of 11 years. The mean log of the number of share and the proceeds generated are of 15.751 and 4.670 respectively.

Table 2: Descriptive Statistics: Initial Returns

	MAIR	BULLISH	BEARISH	AGE	LN PROCEED	Ln NB Shares	VC BACKED	ECO SECTOR
N Valid	198	198	198	198	198	198	198	198
N Missing	0	0	0	0	0	0	0	0
Mean	28.677	35.10%	31.70%	10.83	4.670	15.751	.85	.10
Median	17.082	34.70%	30.29%	9.00	4.682	15.701	1.00	.00
Mode	-30.838 ^a	34.78%	21.70% ^a	6	4.317	15.424	1	0
Std. Deviation	39.721	8.47%	8.46%	9.263	.9157	.6589	.359	.295
Minimum	-30.838	20.21%	18.60%	1	1.609	13.815	0	0
Maximum	197.840	56.91%	52.66%	77	8.999	19.008	1	1

4.1.2. Venture Capital Backed IPOs

New stocks issued that are backed by venture capital are listed on Thomson Reuters' screens. We have flagged such IPOs in our dataset and presented below.

Table 3: IPOs Backed by Venture Capital

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	30	15.2	15.2	15.2
	1	168	84.8	84.8	100.0
	Total	198	100.0	100.0	

The table presents the statistics following the criterion of venture capital backing. In our selection, 84.8% of the IPOs issued are backed by venture capital while 15.2% were not. Venture capital backed IPOs present lower level of underpricing depending on their quality of monitoring compared to the ones that are not (Jahidur Rahman et al. 2021), (Barry et al. 1990). The effect is controlled in this paper.

4.1.3. IPOs Belonging to a High-tech Industry

Furthermore, the table classifies IPOs following the economic sector they belong to. In the sample, 9.6% were from High-tech industry while the highest number of IPOs belonged to the healthcare industry with a percentage of 81.8. In fact, 63 IPOs have been issued by healthcare companies during the year of 2020 and the first quarter of 2021 following the COVID19 outbreak. The high sentiment during the crisis implies that companies issue stocks in hot markets when they are overvalued, and conditions are overall positive. The following industries have a cumulative percentage of 8.6.

Table 4: Descriptive Statics: 1 = High Tech Industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High-tech	19	9.6	9.6	9.6
	Healthcare	162	81.8	81.8	91.4
	Consumer cyclicals	6	3.0	3.0	94.4
	Industrials	7	3.5	3.5	98.0
	Consumer non-cyclicals	2	1.0	1.0	99.0
	Energy	1	.5	.5	99.5
	Basic materials	1	.5	.5	100.0
	Total	198	100.0	100.0	

4.1.4. Descriptive Statistics: Sub-sample

A subsample of 85 IPOs is chosen, and their relative long-term returns defined as the profits generated over a 36-month period are computed, with the goal of examining the influence of market sentiment on the long-term performance of newly issued stocks. Because IPOs have a well-documented history of poor long-term performance, we will study if earlier hypotheses hold true on American stock markets.

Table 5: Descriptive Statistics: Long-term Performance

	BHAR 36	BEARISH	BULLISH	AGE	ECO_SECTOR	VC_BACKED	LN_PROCEED	Ln_NBShares
N Valid	85	85	85	85	85	85	85	85
Missing	0	0	0	0	0	0	0	0
Mean	.220296	28.42%	34.38%	13.35	.12	.80	4.479	15.640
Median	-.558700	28.74%	34.66%	13.00	.00	1.00	4.448	15.607
Mode	-1.4364 ^a	21.70%	44.78%	8	0	1	4.3174 ^a	15.4249
Std. Deviation	2.4980039	5.713%	7.704%	9.022	.324	.402	.7411	.5316
Minimum	-1.4364	18.60%	20.41%	3	0	0	2.7080	14.444
Maximum	17.9436	41.00%	54.11%	67	1	1	7.3195	17.957

The numbers related to the subsample selected are depicted in the table above in the aim of analyzing the long-term behavior of the IPOs' returns relative to investors' sentiment. The 85 IPOs presented an average BHAR of 0.220, a maximum of 17.94, a minimum of -1.436 and a standard deviation of 39. The average bullish ratio was 34.38% while for the bearish ratio it was 28.42%. Firms included in the sample are, on average 13 years of age. The mean log of the number of share and the proceeds generated are of 15.64 and 4.479 respectively.

4.1.5. IPOs Belonging to a High-Tech Industry

From the 85 IPOs, 11.8% belonged to a high tech industry while 88.2% were mainly from healthcare industry. The number of high-tech companies, presenting higher levels of risks and uncertainties, is low in our sample compared to the ones from other industries.

Table 6: Descriptive Statistics: High-Tech Industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	75	88.2	88.2	88.2
	1	10	11.8	11.8	100.0
Total		85	100.0	100.0	

4.1.6. Venture Capital Backed IPOs

The table above presents the number of IPOs backed by venture capital and it appears that 80% of them are while 20% are not backed by venture capital.

Table 7: IPOs Backed by Venture Capital

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	17	20.0	20.0	20.0
	1	68	80.0	80.0	100.0
Total		85	100.0	100.0	

4.2. Bivariate Analysis

4.2.1. Regression Results (1)

The regression table depicts a significant correlation at 1% between the MAIRs and the bullish ratio variable. A collinearity diagnosis has been executed before the regression. The predictors are independent and the bullish ratio is significantly related to the MAIRs observed. Our findings confirm the results found in previous literature. When investors are highly optimistic, the aftermarket prices are high since they hold biased beliefs about the intrinsic value of the IPOs and rational investors who perceive investor sentiment benefit from it by selling the share to them when they are optimistic in the aftermarket. (Cornelli et al. 2004). This might explain the absence of correlation between the bearish ratio and the market adjusted initial returns.

Table 8: Correlation Initial Returns

Control Variables			MAIR	BULLISH	BEARISH
AGE & Ln_PROCEED & Ln_NBShares & VC_BACKED & ECO_SECTOR	MAIR	Correlation	1.000	.475**	.029
		Significance (2-tailed)	.	.000	.685
		df	0	191	191
	BULLISH	Correlation	.475**	1.000	-.402**
		Significance (2-tailed)	.000	.	.000
		df	191	0	191
	BEARISH	Correlation	.029	-.402**	1.000
		Significance (2-tailed)	.685	.000	.
		df	191	191	0

** . Correlation is significant at the 0.01 level (2-tailed).

Table 9: ANOVA*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24017.726	5	4803.545	3.216	.008 ^a
	Residual	286805.362	192	1493.778		
	Total	310823.088	197			
2	Regression	105417.471	7	15059.639	13.930	.000 ^b
	Residual	205405.617	190	1081.082		
	Total	310823.088	197			

* Dependent Variable: MAIR

a. Predictors: (Constant), ECO_SECTOR, AGE, VC_BACKED, Ln_NBShares, LN_PROCEED

b. Predictors: (Constant), ECO_SECTOR, AGE, VC_BACKED, Ln_NBShares, LN_PROCEED, BEARISH, BULLISH

When we isolate investor sentiment in the second model to assess its impact on MAIRs, as shown in the above table, the ANOVA analysis yields a 1% significance level and an F value of 13.93, which further confirms the positive association between market sentiment and first day price run-ups.

4.2.2. Regression Results (2)

Surprisingly, there is no substantial correlation between sentiment ratios and 36-month BHARs. Our findings contradict prior research that found a negative correlation between the variables studied. We have not observed an underperformance; instead, the selected IPOs outperformed the market index S&P500. Researchers have largely admitted the theory of underperforming IPOs in the end, which is against results found in this study.

Table 10: Correlations: Long-term Performance

Control Variables			BHAR 36	BEARISH	BULLISH		
AGE & LN_PROCEED & Ln_NBShares & VC_BACKED & ECO_SECTOR	BHAR 36	Correlation	1.000	.089	-.235		
		Significance (2-tailed)	.	.431	.036		
		df	0	78	78		
	Bootstrap ^a	Bias	Std. Error	.000	.009	.028	
			BCa 95% Lower Confidence Interval	.	-.117	-.425	
		Upper	Confidence Interval	.	.295	.075	
		BEARISH	Correlation	.089	1.000	-.403	
			Significance (2-tailed)	.431	.	.000	
	df		78	0	78		
	Bootstrap ^a		Bias	Std. Error	.009	.000	-.005
				BCa 95% Lower Confidence Interval	-.117	.	-.573
	Upper		Confidence Interval	.295	.	-.252	
BULLISH	Correlation	-.235	-.403	1.000			
	Significance (2-tailed)	.036	.000	.			
	df	78	78	0			
	Bootstrap ^a	Bias	Std. Error	.028	-.005	.000	
			BCa 95% Lower Confidence Interval	-.425	-.573	.	
	Upper	Confidence Interval	.075	-.252	.		

5. CONCLUSION

The paper investigated the correlation between investor sentiment and Initial Public Offerings performance retrieving data from stocks listed on NASDAQ and NYSE. With a sample of 199 IPOs, we computed their first day returns, adjusted to market and with a subsample of 85 we computed the 36 months' abnormal returns using BHAR method. The regression analysis performed to evaluate the underlying relationship between underpriced IPOs and investor sentiment concluded in being positive. In fact, we note a positive significant correlation at a level of 1%. The result is in line with previous literature. However, findings relative to the long run performance contradict earlier research, as there is no evidence of underperformance among companies that went public between January 2015 and April 2021. Instead, over a three-year period, firms, which conducted an IPO, presented higher returns compared to the S&P 500 index and the IPO market's underperformance anomaly has at least temporarily vanished. Further research can be oriented toward understand why the documented poor performance related to IPOs no longer exists, as well as the particular characteristics of US markets which are favorable to the profitability of the new issues in the long run.

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