US IPO RETURNS: CONTRIBUTION OF NON-FINANCIAL FACTORS

by

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A thesis submitted in partial fulfillment of the
requirements for the degree of

MA in Business and Financial Economics

Kyiv School of Economics

2021

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ACKNOWLEDGMENTS

I would like to say a special thank you to my supervisor, professor Olesia Verchenko for her support, guidance and overall insights in this field have made this an inspiring experience for me as well as I want to thank Roman Matviichuk for helping me with some econometrical modeling aspects that is crucial for this research. Also I would like to thank a whole Kyiv School of Economics community of professors and students which together create conditions and desire to learn and reach new heights. Finally, I would like to thank my family for supporting me during the compilation of this thesis.

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LIST OF ABBREVIATIONS

IPO – Initial Public Offering

SPO – Secondary Public Offering

LSE – London Stock Exchange

NYSE – New-York Stock Exchange

CIS – Commonwealth of Independent States

M&A – Merger and Acquisition

SPAC – Special Purpose Acquisition Company

Lock-Up period – Period of time after the listing at which insiders and IPO participants are not allowed to sell stocks. That period may differ for different groups of people

Underwriter – Financial institution that administer the issuance of company's equity (stocks) for fee and stock convertible options

SEC – Security and Exchange Commission

Share allocation (allotment) – Percentage of satisfaction of the investment application

LLP – Limited Liability Partnership

REIT – Real Estate Investment Trust

FED – Federal Reserve System

CHAPTER 1. INTRODUCTION

In recent years, investments in the U.S. IPO market have been gaining momentum, and if earlier, only institutional investors, wealth individuals, funds etc could participate in such events, now this market is becoming more accessible to retail investors and small funds. Interestingly, this trend is observed mainly in the CIS countries, where brokerage firms began to pool their clients' funds for consolidated participation. Investors from the U.S. and other developed countries are not so lucky, on average, the minimum required application amount in these countries is $250,000 to participate in the IPO of each individual company, not to mention the deposit and margin requirements that many brokerage companies require their clients to comply with, at the time for CIS clients, the average order required is $10,000. Thus, the opportunity to invest in the IPO market is quite limited, but it is rapidly developing all over the world as an alternative investment strategy operating with huge capital, the volumes, structure and dynamics of which will be disclosed in the next chapter.

With the opening of this opportunity for investors from the CIS countries, the demand for IPOs began to grow, and given the higher risk premium, especially in the high-volatile 2020 year, investments in IPO for retail investors showed an average return significantly above the broader market (S&P 500), thereby attracting even more attention and capital belonging to investors, mostly without special education, knowledge of deep fundamental analysis, risk management, and the ability to objectively assess the operational and financial prospects of companies conducting IPOs.

There have been many studies of the IPO market already written from the dot-com bubble to 2020, for example, a study of companies' underpricing by sector and industry to create demand for IPOs (Henry Björkqvist & Gustav Kallén, 2018), a study of IPO correlations of companies with a wide market and individual industry indices (Pradeepta Kumar Samanta, 2019), or econometrical attempts to predict IPO returns through financial variables (Amar Galijasevic & Josef Tegbaru, 2019), and many others. The focus of this research belongs to linear regression analysis method to investigate and

test the significance of non-financial factors on listing's performance. Secondly, is to construct investment strategies considering non-financial factors and simulate it on the historical data for last 9 years. Combination of this two methods with theoretical IPO process disclosure may reveal some usefull suggestions to consider in future investments.

CHAPTER 2. INDUSTRY OVERVIEW

2.1. IPO BASICS

IPO is the initial public offering of a company's shares on a stock exchange such as the London Stock Exchange (LSE), New-York Stock Exchange (NYSE), NASDAQ and many others. Both specially issued shares by the company and shares of existing shareholders can be placed on the stock exchange. After the IPO, company changes its status from a private company to a public one, which means that its shares are freely traded on the stock exchange, and anyone can buy them to become a shareholder.

Companies conduct IPOs in order to raise capital for business development, but there may be other purposes, for example, for general corporate purposes, for launching a new project, or buying some other company, or fixing the profits of existing investors, this list is not limited, but IPO also has a number of additional benefits for the company:

- Public companies often receive more attention from the press, investors, clients etc. It is a way to increase brand awareness and public image, which can contribute to the development of the company.
- Existing shareholders gets the opportunity to fix profits on their investments.
- Increased transparency in the form of public financial reporting promotes better communication with clients, investors, creditors and regulatory authorities.
- The company gains access to the international capital market, which gives it more opportunities and flexibility in managing its current capital and raising capital in the future.
- Public companies get the opportunity to hire better management and employees, including due to the liquidity of stocks and options on the market, using different ways to motivate employees.
- Simplifies the conduct of M&A transactions.
- Lowering the cost for both equity and debt.

The IPO procedure also has a number of disadvantages, which include the following:

- IPO is the most complicated and expensive way for a company to go public, the procedure includes many stages and interactions with investment banks, lawyers, and other companies whose services are summed up by large expenses during the entire IPO procedure. For example recent Airbnb IPO cost company nearly $3 billion.
- The company is required to disclose financial, tax, accounting information, business practices, and other business data that may have a significant competitive advantage effect.
- The company acquires additional regular legal and accounting costs.
- The time and costs for preparation of all the necessary reports are significantly increased.
- The risk of not getting the required funding if investors are not satisfied with the initial offering.
- Increased risk of class action lawsuits and consolidated actions of new shareholders.
- Stock volatility can affect the quality of the workflow of the management team and employees.

Listing shares on the stock market always requires significant efforts, time and financial investments, but the IPO process has alternatives, for example Direct Listing, M&A deal, or becoming public through SPAC (Special Purpose Acquisition Company, Blank Check Company).

2.2. IPO PROCEDURE FROM DIFFERENT PERSPECTIVES

This section briefly introduces the steps company faces through IPO procedure and steps the individual investor faces when he intends to invest in that offering in order to understand the proper procedure and both side incentives.

Company’s procedure:

Step 1. Underwriters (the higher the company's market capitalization, the more underwriters are needed to conduct an IPO) evaluate the company, form an estimated price range for the shares and give recommendations to the company's management.

Step 2. The company selects a main underwriter who will lead the listing of the company, there may also be teams from other investment banks.

Step 3. IPO teams are formed, consisting of underwriters, lawyers, accountants, financiers and SEC experts.

Step 4. The company submits registration documents to the SEC and to the exchange, filling out the S1/F1 form, which is constantly updated and can be partially changed before the listing.

Step 5. The company's teams hold a series of presentations, meetings (Roadshow) to understand and assess the demand for their shares and agree on the final price.

Step 6. Form the board of directors.

Step 7. The company issues new shares, or existing investors sell their existing shares (most often this happens together in different proportions), the company receives funds to its accounts - IPO date.

Step 8. The company's shares begin to circulate on the stock exchange - Trading date.

Step 9. From the moment of SEC filing, the company is obliged to comply with the Quiet Period, which ends 40 days after the start of trading. During this period, company representatives are prohibited from disclosing any information about the company and its business.

Investor's procedure:

Step 1. When the company has filed documents with the SEC, the broker sends a notification to the investor about the company is planning an IPO and opportunity to take part in this placement.

Step 2. The investor will know in advance the deadline for accepting applications for participation, IPO date, trading date, Lock-Up period requirements.

Step 3. The investor discovers all the necessary information about the company, such as the S1/F1 form, presentation materials and much more to evaluate the company and make an investment decision.

Step 4. Investor submits an application for participation in the placement (often each broker have its own requirements).

Step 5. The IPO of the company takes place, the shares are divided among investors proportionally. For example, if a company wants to raise $1 billion due to offering, and the amount of investor applications is summed up $2 billion, then each investor who applied for participation will receive shares for ~50% of his application (allocation is ~50%). So it means the greater the demand for shares (hype), the less shares each investor receive proportionally.

Step 6. On the trading date, the shares begin to circulate freely in the market and the investor can see the first day returns on this IPO, but cannot sell the securities until the end of the Lock-Up period. If necessary and desired, the investor can buy additional securities of the company "from the market", but already at the market price, and not at the offering price.

2.3. IPO MARKET OVERVIEW

This section introduces a portion of statistical data about the structure and dynamics of the U.S. IPO market (1980-2020), created by professor Jay R. Ritter from Warrington College of Business. This data shows the IPO market from different angles at different time intervals, assess its growth rate, returns and to get additional insights about valuation and investors' choices and preferences.

The data excludes closed-end funds, REITs, SPACs, LLPs from the field of natural resources, all foreign companies, companies with missing data, IPOs of financial institutions, IPOs with the stock price below $5.

Table 1. Number of IPOs, Aggregated Proceeds and Mean First-day Returns.

		Mean First-day Return			
Year	**Number of IPOs**	**Equal-weighted**	**Proceeds-weighted**	**Aggregate Proceeds, bn**	**Market value at 1st closing, bn**
1980-1989	2 047	7,2%	6,1%	$53.99	$223
1990-1998	3 614	14,8%	13,3%	$222.38	$985
1999-2000	856	64,6%	51,6%	$129.47	$1,294
2001-2020	2 258	16,7%	17,2%	$592.02	$3,609
1980-2020	**8 775**	**18,4%**	**20,1%**	**$1,001.86 b**	**$6,111 b**

Full table with per year information is in the Appendix B. Table 1 above reveals per decade trends of U.S. IPO demand and supply movements over the last 4 decades, but dotcom bubble 1999-2000 years are separated in order to assess it's supply risk appetite, showed by extreme aggregate proceeds and market value at 1-st trading day relative to other periods. Number of IPOs indicated that as well. Overall the trend represents some kind of cyclicality with periods of extreme returns and relatively calm periods. For the last 4 decades IPO returns equaled on average 18,4-20,1% per day depended on calculation method.

Table 2. First trading day Returns, Categorized by Sales.

	1980-1989	**1990-1998**	**1999-2000**	**2001-2020**
	Return	Return	Return	Return
0≤sales<$10m	10,3%	17,4%	68,7%	13,7%
$10m≤sales<$20m	8,6%	18,5%	81,4%	15,9%
$20m≤sales<$50m	7,8%	18,8%	75,5%	20,5%
$50m≤sales<$100m	6,3%	12,8%	62,9%	22,5%
$100m≤sales<$200m	5,1%	11,8%	35,8%	21,7%
$200m≤sales	3,4%	8,7%	25,0%	13,3%
All	**7,2%**	**14,8%**	**64,6%**	**16,7%**

Table 2 clarifies that in period 1980-1989 the smallest by sales category was the most profitable, with lowering returns as amount of sales grew, but next periods are different. In 1990-1998 period the most profitable category were $20m≤sales<$50m. Dotcom bubble period favors the most companies from $10m≤sales<$20m. The last period of 2001-2020 years had the most profitable IPOs in $50m≤sales<$100m category. So there is the trend observed by investors towards preferring higher Sales (Revenue) results.

Figure 1. Negative EPS and Technology Stock Fraction

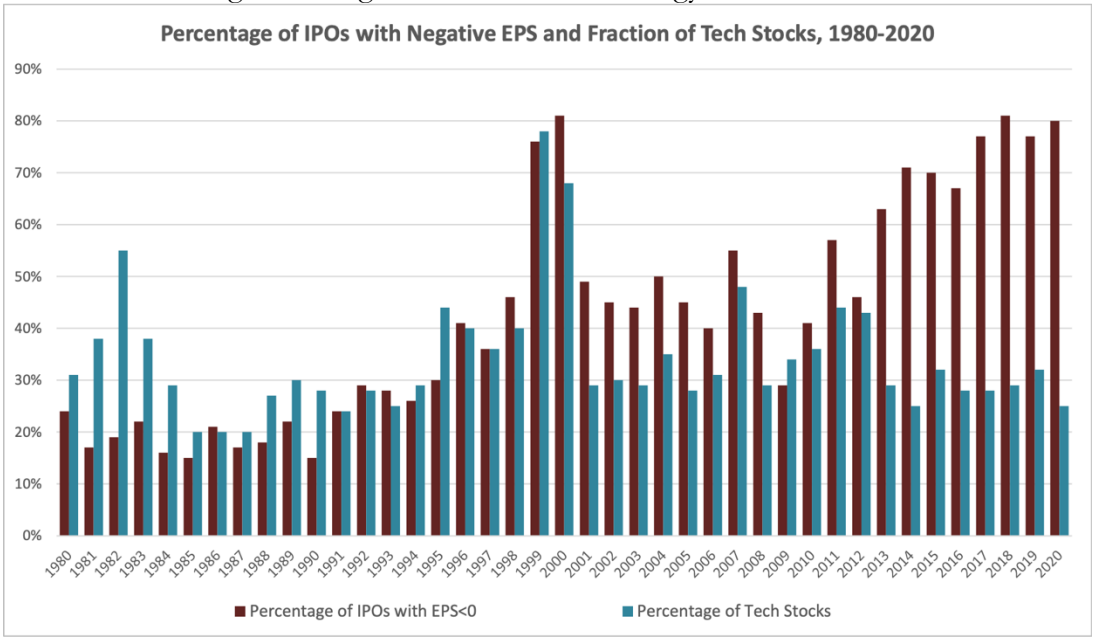


Table 3. Negative EPS and Technology Stock Fraction

Year	Number of IPOs	Percentage Tech Stocks	Percentage of IPOs with EPS<0	Mean First-day Returns	
				EPS<0	EPS≥0
1980-1989	2 047	29%	19%	9,2%	6,8%
1990-1998	3 614	34%	32%	16,0%	14,3%
1999-2000	856	74%	78%	71,1%	41,6%
2001-2020	2 258	32%	59%	18,1%	14,6%
1980-2020	**8 775**	**36%**	**40%**	**26,3%**	**12,9%**

The Figure 1 and Table 3 above shows the trend of IPO investors tend to bear more risk on their investments with share of negative EPS companies constantly growing over the last 40 years, reaching all time high in 2018 equals ~82% of unprofitable companies share. When share of tech stocks is relatively constant fluctuating in 30-45% range with significant spikes in 1999-2000.

Figure 2. Number of U.S. Offering and Average Percentage First-day Return

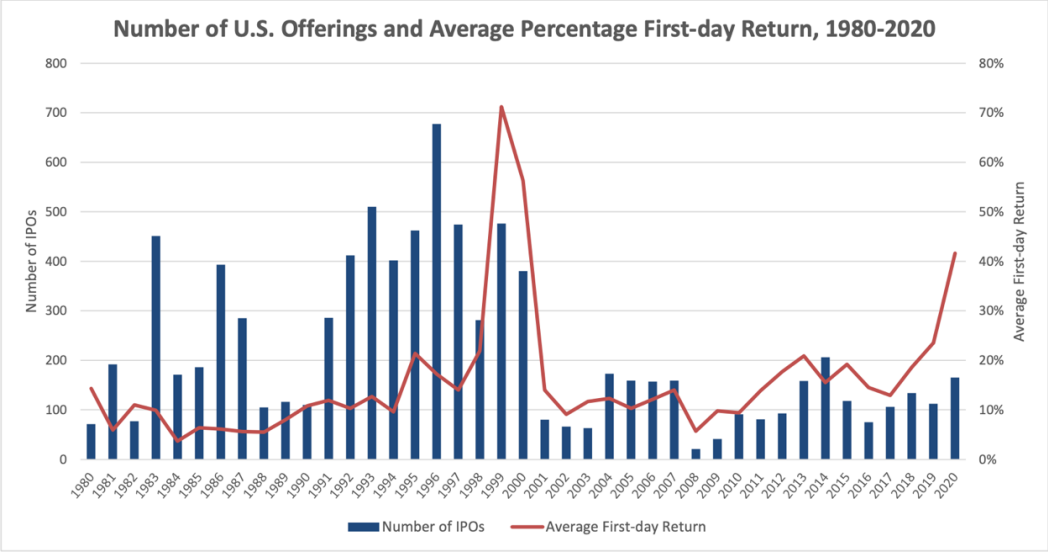


Figure 2 along with figures and tables above depicts that the IPO market is growing at a very strong pace, CAGR 12.6% over the last 40 years, even taking into account the dot-com bubble. For the period 1980-2000 aggregate proceeds were growing 26.4% CAGR, then huge demand drop due to bubble burst summing up -93.8% over the next 3 years till 2004, which is the minimum net proceeds since 1986. After the dot-com bubble burst, IPO market has been growing CARG 7% for the last 20 years ending 2020.

Historically, technology companies have shown significantly above the average market returns. Taking into account the growing market, including due to the dot-com bubble situation, rapid development of technologies and soft monetary policy provided by FED, more and more investors have taken and continue to take more risk expecting to receive an increased returns for their investments.

CHAPTER 3. METHODOLOGY

This chapter introduces methodology and technics used in current research to measure IPO investment performance under different factors in order to discover the significance of that particular factors and to lately model the simulation of several investment strategies relying on that factors to compare it's results with S&P 500 performance for the same period of time and get applicable insights of past performances to consider in future IPO investments.

3.1 MULTIVARIATE LINEAR REGRESION ANALYSIS

Two main reference papers were used for current research. The first is written by Galijasevic and Tegbary (2019), who examined financial metrics, dynamics trends and multiples to construct the model. The second is Björkqvist and Gustav Kallén (2018) examined both financial and non-financial factors, much of similar to current research to construct econometric model.

A regression analysis is used to investigate and test a relationship between the independent variables and the return during the most common lock-up period (3 month) of an IPO. Many researchers build their regression models based on financial metrics, results, dynamics trends or multiples of a company. This study, investigates categorical factors that may significantly affect IPO performance, including: operating sector, exchange, offer amount (divided into small- mid- large-cap divisions), main underwriter bank and performance of S&P 500 index for the corresponding period to include wide-market associated risks and expectations into the model.

The model is given by formula:

$$(1): \qquad y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \varepsilon$$

Every parameter of independent variable represents the expected change in response of dependent variable, when all of the other variable hold constant (ceteris paribus).

Estimation of the model and all diagnosis procedures will be performed in R software. Further diagnosis of the model includes: testing for multicollinearity, testing for normality and testing for heteroscedasticity.

To test for multicollinearity problem in the model, VIF (variance inflation factor) function will be used. It measures how much the variance of any one of the coefficients is inflated due to multicollinearity in the overall model. Presence of multicollinearity problem leads to:

- Coefficients estimated can be unreliable.
- Significance testing for coefficients can be misleading.

To test for normality, Jarque-Bera test will be used to understand whether sample data follows necessary kurtosis and skewness to match a normal distribution. There are few problems arises from violation of the normality. It is important only for the calculation of p-values and the testing of significance as well, but this is only hold for a small sample size.

Studentized Breusch-Pagan test will be used to test for heteroscedasticity problem in the model. Heteroscedasticity by it's nature is simply the absence of homoscedasticity – one of the OLS assumptions, that suggests that all of the errors included into model have the same variance. In the case of presence of heteroscedasticity in the model:

- Estimated coefficients are still reliable.
- P-values and so significance testing become unreliable.

3.2 IPO INVESTMENT STRATEGY SIMULATIONS

This part of the study is devoted to a more applied assessment of the past historical results of investing in IPO differentiated among different factors that were present in the previous linear regression model to compare it's performance with more established strategy of investing in S&P 500 index over the mid-long term period of last 9 years.
All of the further strategies includes the same assumptions.

It is assumed that:

1. Investor understands and undertakes the risk of IPO investment.
2. Initial portfolio balance is $100.000 in cash.
3. Investor is able to receive necessary allocation to open IPO stock position for $5k (that seems reasonably low position for risky investment ideas).
4. Investor is obligated to pay trade fees for BUY order – 5% of order volume and 0,5% for SELL order, which is consistent with real IPO trading fees.
5. Investor desired to maximize portfolio returns, so he will additionally invest into risk-free instrument (10-year treasury bills, yielded 0,65% annually) when he has positive cash balance in his portfolio, and he has to pay interest expense when the cash balance is negative, so he borrowed money to execute next IPO order (interest rate is 12% annually).
6. Investor closes his position in 3 month after IPO, exactly after the first lock-up period is over.

This assumptions reflects the real conditions of investing in IPOs, so they are included into strategy as factors that could significantly inflate overall returns, plus we will be able to see additional insights from fees and interest data from different perspectives.

Strategy algorithm as follows:

1. Initial portfolio balance is $100.000 in cash.
2. Investor executes the BUY order for the first IPO from dataset for $5k buying 500 shares at $10/share on 19.01.2012 and paying fees for that trade. So now he has $94760 cash (fees excluded) and $5 thousand in stocks. There are 6 days till the next IPO, so he invest remaining $94760 of cash into risk-free instrument (earning interest on cash).
3. 6 days later investor withdraws cash from risk-free instrument to invest into next IPO, buying 384 shares for 13$/share and remaining with $5 thousand position in stock A, $4992 position in stock B and $89522 in cash, so investor again invest this cash into risk-free instrument.

4. When lock-up period expired (in 3 month after BUY), investor sells the position expired and gets positive or negative return on position depended on particular IPO.
5. Investor earns interest on cash invested in risk-free instrument when cash balance is positive, but is obligated to pay interest when cash balance is negative (so investor cannot invest in risk-free instrument) because he have to borrow that money to continue IPO investing.
6. Investor is obligated to pay trading fees for every BUY or SELL order according to the fees in the assumptions section.
7. The steps above repeats with every next IPO calculating the fees payed, interest earned/payed, return on every position and cumulative portfolio value.

Table 4. Strategy Simulation Framework

Name	Sector	Ticker	Market	Trade Date	Offer Price	Offer Amount	Underwriter	Lock-up date	94-day Close
Renewable Energy Group	Energy	REGI	NASDAQ	19.01.2012	10	72000000	UBS Investm	23.04.2012	9,01
Verastem	Healthcare	VSTM	NASDAQ	27.01.2012	10	55000000	UBS Investm	30.04.2012	10,38
Caesars Entertainment	Consumer cy	CZR	NASDAQ	08.02.2012	9	16301817	Credit Suisse	14.05.2012	4,9

Order type	Order date	Stock qty (under $5th)	Order Volume, $	Return per IPO	Pre interest portfolio Value	Days between trades	Interest earned/paid	Trade Fees	Cumulative portfolio NET
BUY	19.01.2012	500	-$5 000,0		$95 000	6	10,15	-250,00	$94 760
BUY	25.01.2012	384	-$4 992,0		$89 768	2	3,20	-249,60	$89 522
BUY	27.01.2012	500	-$5 000,0		$84 522	5	7,53	-250,00	$84 279

The simulation itself was performed in Excel and looks like a transaction book shown in Table 4 with different types of BUY/SELL orders ordered by date with necessary calculations performed in order to have strong mathematical and visual control over the data. All the results and graphs are presented in the results chapter.

3.2.1 "LAZY INVESTOR" STRATEGY

"Lazy investor strategy" means that Investor does not conduct any type of analysis and generally invest in all available IPOs in a row without any filters or factors implemented

with positions equivalent for $5000. The historical results (last 10 years) of that strategy are easily comparable with S&P 500 index performance.

3.2.2 STRATEGY MEASUREMENT BY NON-FINANCIAL FACTORS

This step of the research means implementation of different factors (filters in our case) to the strategy and algorithm described above to measure portfolio performance by that particular factors, such as:

- By Sector in which company operates;
- By the exchange, where company is listed (NYSE/NASDAQ);
- By main underwriter investment bank;
- By offer dollar amount (small- mid- large-cap companies).

So investor is able to invest in the IPOs from one particular sector, or one particular exchange, or listed by one particular main underwriter, or only in one if small- mid- large-cap companies division.

All of the secondary metrics, such as average per IPO return, trade fees payed, interest earned or payed and overall portfolio return will be calculated and presented below across entire dataset through "Lazy investor" strategy, or according to factors (filters) implemented. All the results will be compared with S&P 500 index both mathematically and graphically.

CHAPTER 4. DATA

4.1 REGRESSION DATA SPECIFICATION

Collecting the data was performed in semi-manual way. IPO data is a kind of insider information, so it takes some time and effort to find and get access to appropriate database and systematize the data properly. Xignite Market Data Solution was picked as a main data provider about listings itself. Additionally it was necessary to parse data from various financial resources such as Google Finance, that was used for company's stock quotes, Finviz and Yahoo! Finance used to get information about sector in which company operates, IPOscoop and IPOboutique were used to get main underwriter data. The dataset includes:

- Company name;
- Sector in which it operates;
- Ticker symbol;
- Exchange;
- Filling, IPO, first trading, 3 month lock-up period expiration dates;
- Price range from low to high;
- Offer price;
- Amount of shares offered;
- Dollar amount of offer;
- Main underwriter investment bank;
- 1-st trading day and 3 month lock-up period expiration close prices and returns;
- S&P 500 corresponding returns.

Dataset used to construct strategy may not be full and may not reflect the ultimate reality, since there is excluded much of items and observations from the initial dataset due to lack of information or data needed, outliers, etc. All the data was checked and systematized. SPACs, SPOs, REITs, closed-end funds, LLPs from the field of natural resources, foreign companies, all the offerings that were postponed, acquired or cancelled are excluded. There are several companies present in dataset, that filled exchange listing agreement and S1/F1 form in 2011, but started to trade in 2012, so we consider them as IPOs that took place in 2012. Also the companies with broken or missed data, that is unavailable to parse from open financial resources are excluded as well.

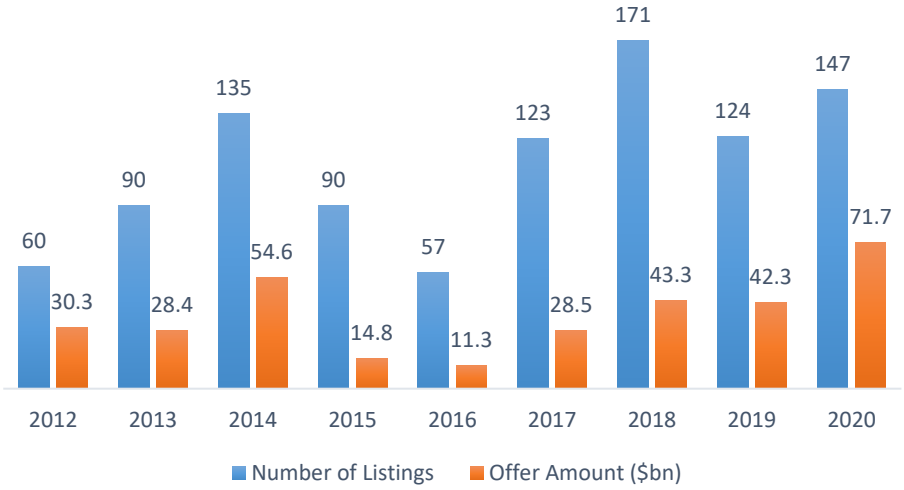
Summing up dataset contains information about 997 companies, which were used in current research. Variables used in model described below in Table 5.

Table 5. Description of the regressors.

Group	**Variable**	**Comment**
Peer	spreturn	Numerical variable represents the performance of S&P 500 index for corresponding dates
Exchange	nysenasdaq	Dummy of 0 for NYSE (base category) and value of 1 for NASDAQ exchange
Offer Amount	midcap	Dummy of 0 for small-cap (base category) and value of 1 for mid-cap companies
	largecap	Dummy of 1 for large-cap companies
Sector	healthcaret echnology	Dummy of 0 represents healthcare (base category) and value of 1 representing companies from technology sector
	financial	Dummy of 1 for companies from financial sector
	cyclical	Dummy of 1 for companies from consumer cyclical sector
	industrials	Dummy of 1 for companies from consumer industrials sector
	energy	Dummy of 1 for companies from consumer energy sector
	estate	Dummy of 1 for companies from consumer real estate sector
	communic ation	Dummy of 1 for companies from consumer communication services sector
	defensive	Dummy of 1 for companies from consumer consumer defensive sector
	materials	Dummy of 1 for companies from consumer basic materials sector
	utilities	Dummy of 1 for companies from consumer utilities sector
Underwriter	goldman	Dummy of 0 represents category "Other" (base category) and value of 1 representing Goldman Sachs
	stanley	Dummy of 1 for Morgan Stanley as main underwriter
	morgan	Dummy of 1 for J.P. Morgan as main underwriter
	bofa	Dummy of 1 for BofA Securities as main underwriter
	citigroup	Dummy of 1 for Citigroup as main underwriter
	suisse	Dummy of 1 for Credit Suisse as main underwriter
	jefferies	Dummy of 1 for Jefferies as main underwriter
	barclays	Dummy of 1 for Barclays as main underwriter

4.2 DATASET OVERVIEW

Figure 3. U.S IPOs & Offer Amount distribution by year



According to Figure 3, number of U.S. listings grows at 22% average Y/Y and 12% CAGR, facing minimum of 57 IPOs in 2016 and maximum of 171 IPOs in 2018.

Offer amount grows as well, but at more rapid rate of 33% average Y/Y and 11% CAGR, facing minimum of $11,3 billion of net proceeds in 2016 and maximum of $71,7 billion in 2020.

Figure 4. U.S IPOs distribution by Exchange

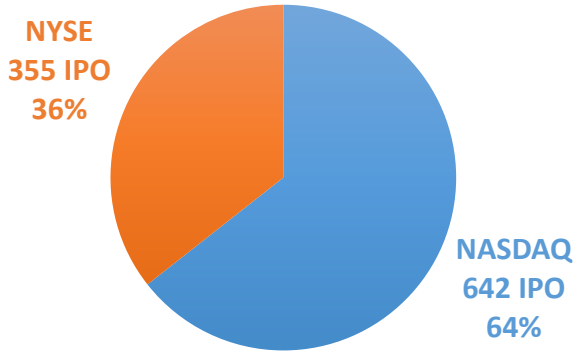
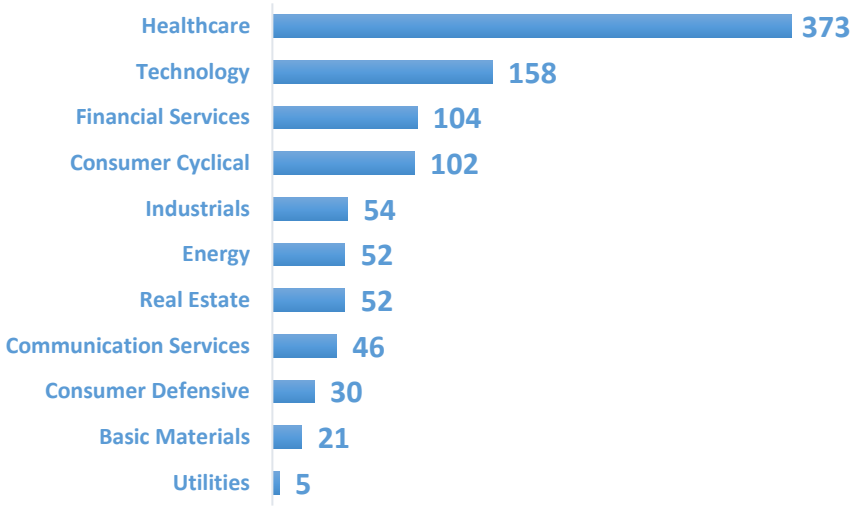


Figure 4 shows that for the last 9 years, according to dataset there were listed 997 companies in the U.S. that are applicable for current study, 642 (or 64%) of them were listed on NASDAQ and 355 (or 36%) were listed on NYSE exchange.

Additional data about sectors in which companies from dataset are operating were parsed from Yahoo! Finance and Finviz. There are 11 sectors present in the dataset namely: Healthcare, Technology, Financial Services, Consumer Cyclical, Energy, Industrials, Real Estate, Communication Services, Consumer Defensive, Basic Materials, Utilities.

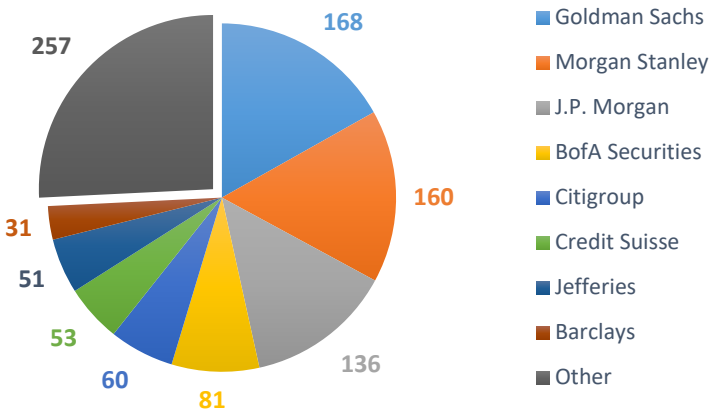
Figure 5. U.S IPOs distribution by Sector



The largest share of U.S listings provided by Healthcare and Technology sectors is 373 (37,4%) and 158 (15,8%) IPOs respectively. The smallest share provided by Utilities and Materials sectors is 5 (0,5%) and 21 (2,1%) IPOs respectively, depicted by Figure 5.

Main underwriter data was given from IPOboutique and IPOscoop resources and Warrington College of Business IPO data page created and maintaining by Jay R. Ritter. Dataset contains all underwriters that carried IPOs by companies, but strategy simulation includes only main underwriter information in order to get more precise results without data intersection.

Figure 6. U.S IPOs distribution by main Underwriter



Distribution of main underwriters is shown in Figure 6. TOP-3 underwriters is Goldman Sachs, Morgan Stanley and J.P. Morgan carried out 168 (16,9%), 160 (16%) and 136 (13,6%) IPOs respectively. Other category includes 257 IPOs and represents almost 26% of entire dataset. Full list of underwriters is in Appendix A.

Stock quotes were parsed from Google Finance. All data needed for further strategy simulation and testing, such as returns, fees, interest earned/payed, pre interest portfolio balance and cumulative portfolio balance was calculated manually during the simulation itself in Excel.

Figure 7. Average 1-day return vs 94-day return by year

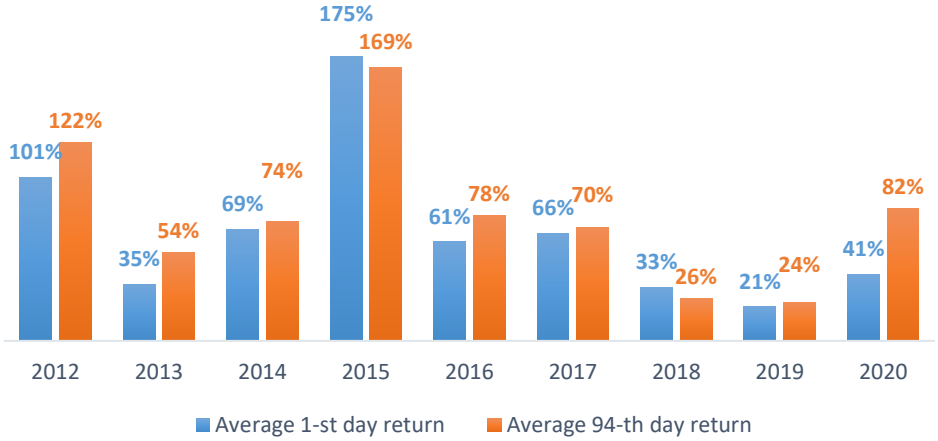


Figure 7 above reveals the dynamics of IPO underpricing for previous decade. Closing stock quotes were parsed for the 1-st. trading date and close for 94-th. trading day (the most common lock-up period for retail investors). Some of the price quotes in initial dataset were not founded, so that companies will not be used in future calculations, additionally companies with extreme returns (outliers) were deleted as well in order to not affect average trends.

CHAPTER 5. RESULTS

5.1 REGRESSION RESULTS

Except for factor variables described above, current OLS regression also includes S&P500 returns variable, that are corresponding to each IPO observation in order to adjust for wide-market sentiment and risk. Model was estimated using R software. Model formula as follows:

(2): $$dayreturn = \beta_0 + \beta_1 spreturn + \beta_2 nysenasdaq + \beta_3 midcap + \beta_4 largecap + \beta_5 healthcaretechnology + \beta_6 financial + \beta_7 cyclical + \beta_8 industrials + \beta_9 energy + \beta_{10} estate + \beta_{11} communication + \beta_{12} defensive + \beta_{13} materials + \beta_{14} utilities + \beta_{15} goldman + \beta_{16} stanley + \beta_{17} morgan + \beta_{18} bofa + \beta_{19} citigroup + \beta_{20} suisse + \beta_{21} jefferies + \beta_{22} barclays + \varepsilon_0$$

Table 6. Initial OLS results

Variable	Coefficient	Std. Error	t-Statistic	p-value
Intercept	1.056 ***	0.281	3.762	0.000
spreturn	1.896	1.263	1.501	0.133
nysenasdaq	0.095	0.193	0.490	0.624
midcap	-0.306	0.206	-1.482	0.138
largecap	-0.348	0.237	-1.466	0.142
healthcaretechnology	-0.402 *	0.240	-1.674	0.094
financial	-0.522 *	0.272	-1.921	0.055
cyclical	-0.069	0.283	-0.244	0.807
industrials	-0.439	0.365	-1.201	0.229
energy	0.746 *	0.388	1.926	0.054
estate	-0.718 *	0.383	-1.876	0.060
communication	-0.513	0.374	-1.373	0.170
defensive	-0.198	0.449	-0.441	0.659
materials	0.324	0.545	0.595	0.551
utilities	-0.839	1.053	-0.796	0.425
goldman	0.007	0.267	0.024	0.980
stanley	-0.036	0.264	-0.135	0.892
morgan	0.049	0.273	0.178	0.858
bofa	-0.328	0.319	-1.029	0.303
citigroup	-0.347	0.346	-1.005	0.315
suisse	-0.045	0.362	-0.124	0.901
jefferies	-0.408	0.367	-1.112	0.266
barclays	-0.262	0.462	-0.566	0.571
R-squared	**0.030**			
Adj. R-squared	**0.008**			
F-statistic	**1.375**			
p-value (F-stat.)	**0.116**			

*Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

Small-cap company from healthcare sector, which was underwritten by investment bank from "other" category is a base scenario for the model.

The results in Table 6 shows, that the intercept (average initial return in base scenario) is quite high and it is statistically significant, since corresponding p-value is approximately zero, but other variables are not significant, so it's effect on the return is statistically zero, expect for slight ~10% confidence interval significance of the $healthcaretechnology, financial, energy$ and $estate$ variables.

Next step is to examine the presence of multicollinearity problem in the model using VIF (variance inflation factor) function in R software, shown in Table 7 below.

Table 7. Examining for multicollinearity via VIF

Variable	VIF	Variable	VIF
spreturn	1.035	defensive	1.094
nysenasdaq	1.592	materials	1.136
midcap	1.837	utilities	1.027
largecap	2.337	goldman	1.859
healthcaretechnology	1.429	stanley	1.746
financial	1.279	morgan	1.629
cyclical	1.362	bofa	1.410
industrials	1.267	citigroup	1.255
energy	1.377	suisse	1.222
estate	1.345	jefferies	1.212
communication	1.141	barclays	1.192

The numerical value for VIF shows (in decimal form) what percentage the variance (i.e. the standard error squared) is inflated for each coefficient. A rule of thumb for interpreting the variance inflation factor: 1 = not correlated; from 1 to 5 = moderately correlated; greater than 5 = highly correlated.

In that case none of the variable shows VIF higher then 5, all of the variables in the 1-2 range, except for $largecap$ variable only slightly exceeded 2. Conclusion is that there is no multicollinearity problem present in the model.

Third step is to test the normality using Jarque-Bera test in R software to figure out whether sample data follows normal distribution.

Table 8. Jarque-Bera normality testing

Data	chi2	df	p-value
Model residuals	92.036	2	0.0000

Approximately zero p-value according to normality testing in Table 8 means that there is no evidence to reject the null hypothesis of the test that sample data is normally distributed. So, the diagnosis procedures proceeding without any changes.

Fourth step is to examine the model estimated for heteroscedasticity problem using studentized Breusch-Pagan test.

Table 9. Studentized Breusch-Pagan test for heteroscedasticity

Data	BP	df	p-value
Model data	40.963	22	0.0083

BP score from Table 9 equals ~41, with p-value equals 0.0083, which is significantly less than 0.05, thus there is enough evidence to reject the null hypothesis of BP test, that suggest homoscedasticity in the model, so heteroscedasticity is present.

To deal with heteroscedasticity problem, robust standard errors were used in R software. Heteroskedasticity itself does not produce biased OLS estimates, it leads to a bias in the variance-covariance matrix, which means that t-tests and so p-values cannot be reliable.

The results shown below in Table 10 depicts the significance of the model and significance of several explanatory variables improved with use of robust standard errors. Intercept equals 1.0556 and it is statistically significant with p-value equals 0.002. That means that base scenario IPO (small-cap, healthcare sector, "other" underwriter) on average produces return of ~105% holding other variables constant.

Table 10. Final OLS results

Variable	Coefficient	Std. Error	t-Statistic	p-value
Intercept	1.056 **	0.342	3.085	0.002
spreturn	1.896 *	0.858	2.210	0.027
nysenasdaq	0.095	0.171	0.555	0.579
midcap	-0.306	0.215	-1.423	0.155
largecap	-0.348	0.223	-1.560	0.119
healthcaretechnology	-0.402 *	0.165	-2.436	0.015
financial	-0.522 *	0.226	-2.310	0.021
cyclical	-0.069	0.284	-0.243	0.808
industrials	-0.439 *	0.211	-2.078	0.038
energy	0.746	0.739	1.010	0.313
estate	-0.718 **	0.224	-3.206	0.001
communication	-0.513 **	0.193	-2.656	0.008
defensive	-0.198	0.282	-0.703	0.482
materials	0.324	1.047	0.310	0.757
utilities	-0.839 **	0.322	-2.607	0.009
goldman	0.007	0.226	0.029	0.977
stanley	-0.036	0.263	-0.136	0.892
morgan	0.049	0.283	0.172	0.863
bofa	-0.328	0.205	-1.600	0.110
citigroup	-0.347	0.299	-1.160	0.246
suisse	-0.045	0.529	-0.085	0.932
jefferies	-0.408	0.306	-1.335	0.182
barclays	-0.262	0.464	-0.563	0.573
R-squared	**0.030**			
Adj. R-squared	**0.008**			
F-statistic	**1.375**			
p-value (F-stat.)	**0.116**			

*Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$*

S&P 500 index performance (*spreturn variable*) also has statistically significant effect with coefficient equals 1.8955 and p-value equals 0.027, which means that 1% increase in S&P 500 index during lock-up period leads to ~1.9% increase in base case IPO return (almost doubled) holding other variables constant.

If company operates in Technology sector (instead of base case Healthcare sector), it leads to statistically significant (p-value equals 0.015) on average ~40% less return during lock-up period holding other variables constant. Financial sector variable is significant as well with p-value equals 0.021, generating on average ~52% less return holding other variables constant. Companies from Industrial, Real Estate, Communication Services and Utilities sectors are also statistically significant, leads to on

average ~44%, ~72%, ~51%, ~84% less return respectively during lock-up period, holding other variables constant.

It turns out, offer amount (capitalization of the company), exchange and main underwriter factors have no statistically significant effect on IPO return during lock-up period as well as Consumer Cyclical, Energy, Consumer Defensive and Basic Materials sectors.

5.2 "LAZY INVESTOR" STRATEGY RESULTS

"Lazy Investor" strategy suggests that investor does not conduct any type of analysis and simply invested in all available IPOs in a row with positions equivalent for $5000. This strategy simulation will reveal us historical performance of IPO investing for last 9 years in order to compare it results with S&P 500 returns.

Figure 8. "Lazy investor" strategy vs S&P 500 comparison

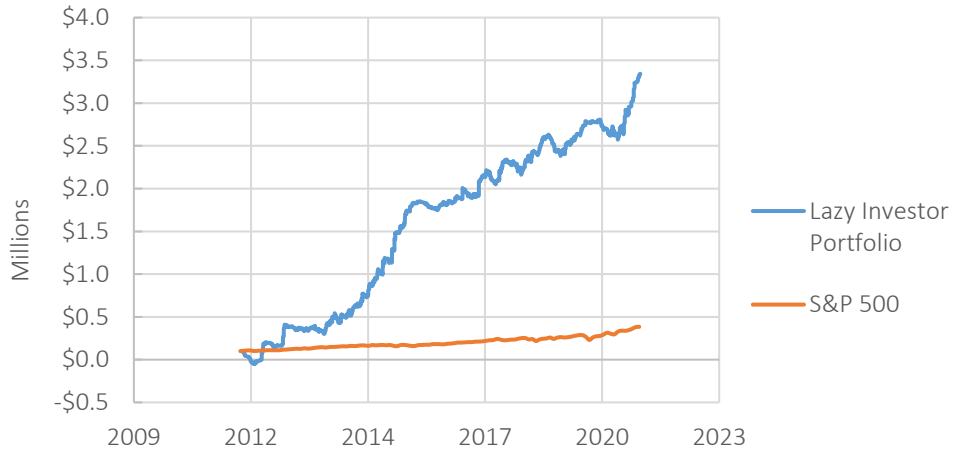


Figure 8 above and Table 11 below shows that IPO investment generated significantly higher portfolio balance for last 9 years but expectedly was more volatile than S&P 500 index. Both portfolios started from $100k and resulted in $3,54 million for IPO and $383 thousands for S&P strategies with 3243% ROI or 55% CAGR vs 284% ROI or 18% CAGR respectively.

Table 11. "Lazy investor" strategy vs S&P 500 comparison

	"Lazy investor"	**S&P 500**
Initial Portfolio Value	$100 000	
Final Portfolio Value	$3 343 406	$383 536
Average per IPO return	69%	-
IPO amount	997	-
Trade Fees Payed	$291 057	0
Interest Earned/Payed	$95 175	0
ROI	3243%	284%
CAGR	55%	18%

$291,057 were payed in fees, which is quite high number. 997 IPOs participated with average 3-month performance of 69%. "Lazy investor" strategy outperformed S&P 500 index more than 11x.

5.3 SECTOR RELATED STRATEGY RESULTS

The previous simulation was repeated but by different sectors as a factor, assumed that investor only was able to invest in IPOs from one specific sector. Settings remained the same, initial portfolio value is $100.000 with IPO positions equals $5000.

The simulation below was performed for all present sectors and not combined some of them into "Other" category for clarity. The results shown in Figure 9 and Table 12 below.

In absolute terms the most profitable are Healthcare and unexpectedly Energy sectors, which results in 1678% and 383% ROI respectively, or 43% and 22% CAGR respectively as well. The worst performers were Utilities and Real Estate, which resulted in 1% and 10% ROI respectively, or 0% and 1% CAGR respectively as well.

In relative terms the most profitable were Energy and Basic Materials sectors, with results of 145% and 103% average per IPO return respectively, carried out 52 and 21 IPOs for last 9 years. The worst relative performer was Utilities resulted -2% average per IPO return.

Figure 9. Sector related strategies vs S&P 500 comparison

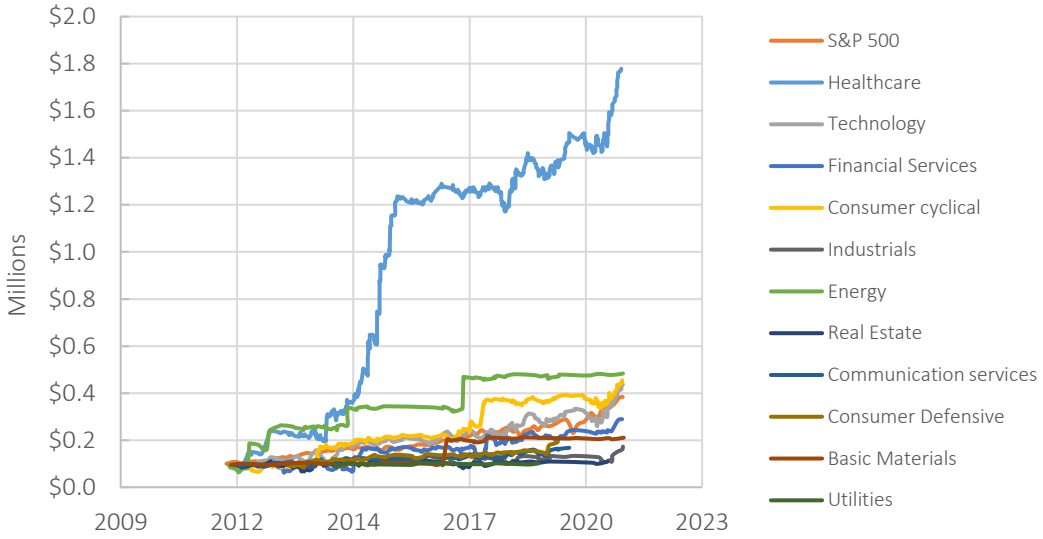


Table 12. Sector related strategies vs S&P 500 comparison

	Health care	**Techno logy**	**Fin. Services**	**Cons. Cyclical**	**Industri als**	**Energy**
Initial Portfolio Value			$100 000			
Final Portfolio Value	$1.78m	$436 984	$289 443	$454 959	$172 777	$483 341
Average per IPO return	93%	47%	40%	73%	30%	145%
IPO amount	373	158	104	102	54	52
Trade Fees Payed	$111 136	$45 244	$29 607	$29 870	$15 240	$16 174
Interest Earned/Payed	$54 860	$12 606	$9 531	$14 452	$6 984	$21 395
ROI	1678%	337%	189%	355%	73%	383%
CAGR	43%	20%	14%	21%	7%	22%
	Real Estate	**Comm. Services**	**Cons. Defensive**	**Material s**	**Utilities**	**S&P500**
Initial Portfolio Value			$100 000			
Final Portfolio Value	$109 971	$167 595	$192 344	$210 662	$101 181	$383 536
Average per IPO return	7%	32%	64%	103%	-2%	-
IPO amount	52	46	30	21	5	-
Trade Fees Payed	$14 381	$13 005	$8 720	$6 310	$1 371	$0
Interest Earned/Payed	$5 788	$6 213	$5 424	$8 883	$3 137	$0
ROI	10%	68%	92%	111%	1%	284%
CAGR	1%	7%	9%	10%	0%	18%

Healthcare, Technology, Consumer Cyclical and Energy strategies outperformed S&P 500 index, on the other hand Financial Services, Industrials, Real Estate, Communication Services, Consumer Defensive and Utilities significantly underperformed index.

The biggest amount of trading fees were paid out by Healthcare and Technology strategies, because of the largest amount of listings among dataset with $111.136 and $45.244 payed in fees.

5.4 EXCHANGE RELATED STRATEGY RESULTS

This factor implies investor was only able to invest in companies listed whether on NASDAQ or NYSE versus S&P 500 index.

In both absolute and relative terms the most profitable strategy was to invest in NASDAQ IPOs. Average return per company resulted in 79% vs 51% for NYSE listings. NASDAQ final portfolio equals $2,52 million with total 2421% ROI or 50% CAGR vs $929 thousand for NYSE portfolio with 829% ROI or 32% CAGR. Results are shown in Figure 10 and Table 13 below.

Figure 10. Exchange related strategies vs S&P 500 comparison

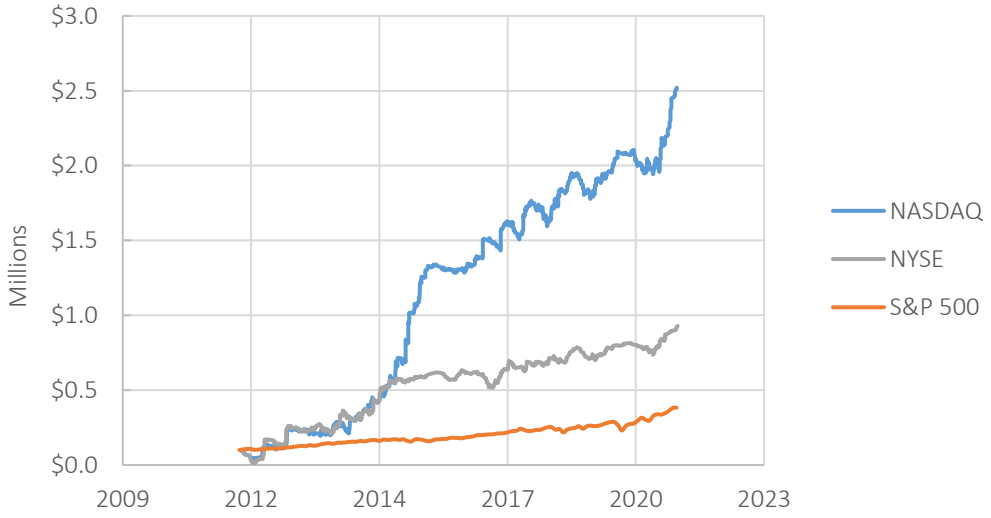


Table 13. Exchange related strategies vs S&P 500 comparison

	NASDAQ	NYSE	S&P500
Initial Portfolio Value		$100 000	
Final Portfolio Value	$2 521 054	$929 055	$383 536
Average per IPO return	79%	51%	-
IPO amount	642	355	-
Trade fees payed	$189 054	$102 004	$0
Interest earned/payed	$69 529	$32 350	$0
ROI	2421%	829%	284%
CAGR	50%	32%	18%

Both strategies significantly outperformed S&P 500 index, more than 8x for NASDAQ and nearly 3x for NYSE.

5.5 OFFER AMOUNT RELATED STRATEGY RESULTS

The procedure remained the same assumed that investor was able to invest whether in Small-Cap (under $80 mln.), or Mid-Cap ($80 - $200 mln.), or Large-Cap (from $200 mln.) companies. The relationship between categories and Market Capitalization is taken from Investopedia.

Strategy resulted generally as expected, the less Offer Amount and Market Capitalization of the company, the higher return it generated on average. In both absolute and relative terms small-cap companies were the best performers, following by mid-cap and large-cap. Simulation dynamics shown in Figure 11 below.

Small-caps ended $1,4 million worth with 93% average per IPO return vs mid-caps ended $1,2 million with 65% per IPO return vs large-caps ended $921 thousand with 53% per IPO return. Small-caps generated 1316% ROI or 39% CAGR vs mid-caps generated 1118% ROI or 37% CAGR vs large-caps generated 822% ROI or 32% CAGR.

Figure 11. Offer Amount related strategies vs S&P 500 comparison

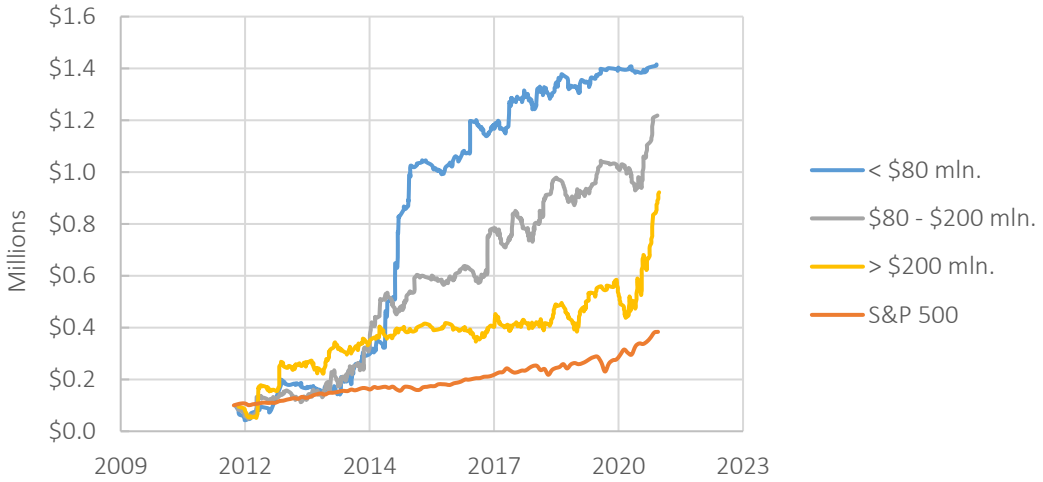


Table 14. Offer Amount related strategies vs S&P 500 comparison

	<$80m	**$80m-$200m**	**>$200m**	**S&P500**
Initial Portfolio Value		$100 000		
Final Portfolio Value	$1.42m	$1.22m	$0.92m	$0.38m
Average per IPO return	93%	65%	53%	-
IPO amount	292	367	338	-
Trade fees payed	$86 997	$106 756	$97 305	$0
Interest earned/payed	$49 977	$34 630	$22 958	$0
ROI	1316%	1118%	822%	284%
CAGR	39%	37%	32%	18%

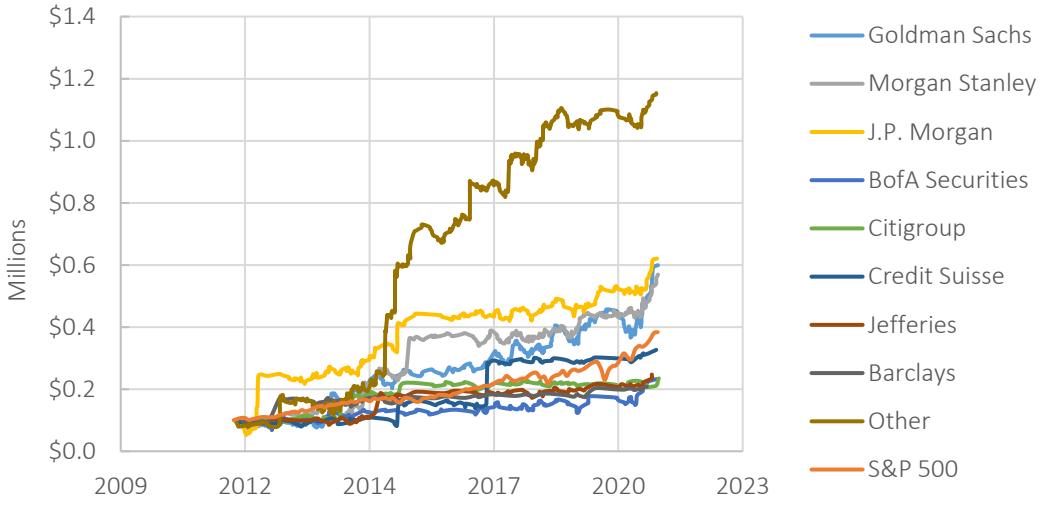
Interesting observation according to Table 14 is that the most profitable in absolute and relative terms small-cap strategy generated the least trade fees amount with the lowest IPO amount contained in the category.

All the strategies highly outperformed S&P 500 index, 4.6x for small-caps, 4x for mid-caps and 3x for large-caps.

5.6 MAIN UNDERWRITER RELATED STRATEGY RESULTS

It is assumed that investor was only able to invest in investment ideas of a particular investment bank. Top-8 underwriters by amount of companies listed were tested, namely: Goldman Sachs, Morgan Stanley, J.P. Morgan, BofA Securities, Citigroup, Credit Suisse, Jefferies and Barclays. All remaining banks were placed into "Other" category (53 banks).

Figure 12. Underwriter related strategies vs S&P 500 comparison



Dynamics of portfolios are shown in Figure 12 above. In absolute terms the highest performance showed category "Other" and J.P. Morgan ended up with $1,15 million and $620 thousand respectively, with 1054% ROI or 36% CAGR and 520% ROI or 26% CAGR respectively as well. On the other hand, Barclays performed the worst, generated only 108% ROI or 10% CAGR.

In relative terms the highest performance were showed by Credit Suisse and category "Other" with 87% and 85% return per IPO. The lowest performance in sample was showed by BofA Securities equals 36% return per IPO. Results presented below in Table 15.

Table 15. Underwriter related strategies vs S&P 500 comparison

	Goldman Sachs	**Morgan Stanley**	**J.P. Morgan**	**BofA**	**Citibank**
Initial Portfolio Value			$100 000		
Final Portfolio Value	$599 448	$569 175	$620 492	$232 697	$234 706
Average per IPO return	63%	62%	79%	36%	47%
IPO amount	168	160	136	81	60
Trade fees payed	$48 802	$46 436	$40 039	$22 989	$17 189
Interest earned/payed	$15 757	$17 744	$22 829	$7 940	$10 981
ROI	499%	469%	520%	133%	135%
CAGR	25%	24%	26%	11%	11%

	Credit Suisse	**Jefferies**	**Barclays**	**Other**	**S&P500**
Initial Portfolio Value			$100 000		
Final Portfolio Value	$326 668	$247 141	$208 173	$1.15m	$383 536
Average per IPO return	87%	60%	69%	85%	-
IPO amount	53	51	31	257	-
Trade fees payed	$15 714	$14 773	$9 051	$76 065	$0
Interest earned/payed	$11 305	$9 501	$9 764	$38 016	$0
ROI	227%	147%	108%	1054%	328%
CAGR	16%	12%	10%	36%	20%

Interesting observation from Table 15 is that on average category "Other" generated higher per IPO return, which means that on average second-tier investment banks have been underpricing companies more before listing than first-tier banks, hence they are on average raised capital less efficient for companies they are working with, even though it's IPOs generating higher return, except for Credit Suisse.

Only Goldman Sachs, Morgan Stanley, J.P. Morgan and "Other" category outperformed S&P 500 index.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

6.1 OLS REGRESSION RELATED CONCLUSIONS

Multivariate OLS regression analysis showed that overall IPO returns are statistically different from zero and significantly higher than average S&P 500 mid- or long-term performance, which is represented by statistically significant intercept of 1.0556 for the base category with corresponding p-value of 0.002.

Also there is enough evidence to say that IPO returns are greatly dependent on the S&P 500 index return itself, but much more volatile with b=~1,89 for entire dataset.

Some of the sectoral factors showed statistically significant deviations from base category as well, namely: Healthcare, Technology, Financial Services, Industrials, Real Estate, Communication Services and Utilities sectors. All other sector variables didn't show any statistically reliable effect.

Market capitalization of the IPO as well as main underwriter variables didn't show any statistically significant effect either.

6.2 IPO INVESTMENT STRATEGY RELATED CONCLUSIONS

There is enough evidence from the strategies simulations performed that IPO investments significantly outperformed S&P 500 both in short-term and long-term periods for the last 9 years. The average per IPO return for entire dataset is 69,1% (3-month lock-up period), which is incredibly high, consider that outliers with the highest returns were deleted from the calculations and reinvestment was not taking place in percentage terms. Overall for the last 9-year period, lazy IPO investment strategy outperformed S&P 500 index 12x multiple for single returns and 3x CAGR.

It seems the most reasonable decision to use "Lazy Investor" strategy because of the highest absolute portfolio return that outperforms S&P 500 index 12x multiple, and wide diversification between the exchanges, sectors, industries, main underwriters (to avoid risk of unethical practices) and diversification among market capitalization as well, since stock prices of each company behaves uniquely to avoid unsystematic and minimize

systematic risks. On the other hand, such a strategy includes higher amount of transactions, because of higher amount of companies and resulted in higher brokerage fees, which negatively affects performance.

Current thesis is not an investment advice or recommendation, it's created in order to asses and understand current trends from different angles to consider in conducting proper investment analysis and to correct analysts' future expectations. The settings of the simulations and dataset were constructed in such a way to reflect the real investment conditions as objectively as possible.

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APPENDIX A

Full list of main underwriters and number of IPOs presented in dataset.

Goldman Sachs	229	Ladenburg Thalmann	8	WR Hambrecht	2
Morgan Stanley	221	Maxim Group	8	Needham & Company	2
J.P. Morgan	189	ViewTrade Securities	7	Craig-Hallum	2
BofA Securities	127	RBC Capital Markets	6	Benchmark	2
Citigroup	101	Cantor	6	FIG Partners	2
Credit Suisse	98	William Blair	5	SunTrust Robinson Humphrey	1
Jefferies	83	JMP Securities	4	Lazard Capital Markets	1
Barclays	63	Canaccord Genuity	4	Scarsdale Equities	1
Stifel	38	Laidlaw & Company	4	Newport Coast Securities	1
Deutsche Bank	35	Northland Capital Markets	4	D.A. Davidson & Co.	1
Cowen	28	National Securities	4	Rodman & Renshaw	1
Sandler O'Neill & Partners	24	Network 1 Financial Securities	4	CIBC Capital Markets	1
UBS Investment Bank	21	AMTD	4	Spartan Securities	1
SVB Leerink	21	Wunderlich Securities	3	Evercore ISI	1
Piper Jaffray	21	MDB Capital Group	3	Joseph Gunnar & Co.	1
Roth Capital	21	WallachBeth Capital	3	CICC	1
Aegis Capital	18	ThinkEquity	3	Univest Securities	1
Wells Fargo	14	Stephens	3	I-Bankers Securities	1
BMO Capital Markets	13	Dawson James Securities	2	Piper Sandler	1
Raymond James	12	Janney Montgomery Scott	2	Keybanc Capital Markets	1
Baird	11	Burnham Securities	2	Berenberg	1
Oppenheimer	9	Keefe	2		
FBR Capital Markets	9	Chardan Capital Markets	2		

APPENDIX B

Number of IPOs, Aggregated Proceeds and Mean First-day Returns

Year	Number of IPOs	Mean First-day Return		Aggregate Left on the Table, bn	Aggregate Proceeds, bn	Market value at 1st closing, bn
		Equal-weighted	Proceeds-weighted			
1980	71	14,3%	20,0%	$0.18	$0.91	$5.88
1981	192	5,9%	5,7%	$0.13	$2.31	$10.71
1982	77	11,0%	13,3%	$0.13	$1.00	$5.11
1983	451	9,9%	9,4%	$0.84	$8.89	$41.35
1984	171	3,7%	2,5%	$0.05	$2.02	$8.76
1985	186	6,4%	5,3%	$0.23	$4.09	$15.18
1986	393	6,1%	5,1%	$0.68	$13.40	$46.77
1987	285	5,6%	5,7%	$0.66	$11.68	$45.59
1988	105	5,5%	3,4%	$0.13	$3.88	$21.65
1989	116	8,0%	4,7%	$0.27	$5.81	$22.37
1990	110	10,8%	8,1%	$0.34	$4.27	$17.79
1991	286	11,9%	9,7%	$1.50	$15.35	$54.06
1992	412	10,3%	8,0%	$1.82	$22.69	$74.35
1993	510	12,7%	11,2%	$3.52	$31.44	$126
1994	402	9,6%	8,3%	$1.43	$17.18	$64
1995	462	21,4%	17,5%	$4.90	$27.95	$127
1996	677	17,2%	16,1%	$6.76	$42.05	$215
1997	474	14,0%	14,4%	$4.56	$31.76	$141
1998	281	21,9%	15,6%	$5.25	$33.65	$164
1999	476	71,2%	57,4%	$37.11	$64.67	$652
2000	380	56,3%	45,8%	$29.68	$64.80	$642
2001	80	14,2%	8,4%	$2.97	$35.29	$177
2002	66	9,1%	5,1%	$1.13	$22.03	$84
2003	63	11,7%	10,4%	$9.96	$9.54	$40
2004	173	12,3%	12,4%	$3.86	$31.19	$148
2005	159	10,3%	9,3%	$2.64	$28.23	$105
2006	157	12,1%	13,0%	$3.95	$30.48	$135
2007	159	14,0%	13,9%	$4.95	$35.66	$212
2008	21	5,7%	24,8%	$5.63	$22.76	$63
2009	41	9,8%	11,1%	$1.46	$13.17	$59
2010	91	9,4%	6,2%	$1.84	$29.82	$113
2011	81	13,3%	13,0%	$3.51	$26.97	$160
2012	93	17,7%	8,9%	$2.77	$31.11	$181
2013	158	20,9%	19,0%	$7.89	$41.57	$270
2014	206	15,5%	12,8%	$5.40	$42.20	$238
2015	118	19,2%	18,7%	$4.16	$22.00	$150
2016	75	14,5%	14,4%	$1.80	$12.52	$79

2017	106	12,9%	16,0%	$3.68	$22.98	$162
2018	134	18,6%	19,1%	$6.39	$33.47	$216
2019	112	23,5%	17,7%	$6.93	$39.18	$331
2020	165	41,6%	47,9%	$29.66	$61.86	$687
1980-1989	2 047	7,2%	6,1%	$3.30	$53.99	$223
1990-1998	3 614	14,8%	13,3%	$30.07	$222.38	$985
1999-2000	856	64,6%	51,6%	$66.79	$129.47	$1,294
2001-2020	2 258	16,7%	17,2%	$101.57	$592.02	$3,609
1980-2020	**8 775**	**18,4%**	**20,1%**	**$201.74**	**$1,001.86 b**	**$6,111 b**