Erasmus School of Economics

A cross-sector study: The Effects of a Company's IPO Environment on Long-Term Company Performance

Master Thesis

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Abstract

CEOs are imprinted by the economic environment when they enter the job market for the first time. This imprinting affects the CEOs decision making and hence influences the capital structure and performance of the companies they lead. During uncertain times, companies can similarly be imprinted by the economic environment. This master thesis investigates whether the economic environment, at a company's IPO, has significant long-term effects on company performance. This thesis study uses a dataset which includes 255590 observations from 4891 public companies from the United States. To examine the possible effects between the economic environment at IPO and future company performance, mixed-effects ML-regression model are run. These regression models prove that companies that go public during recessions significantly outperform firms that go public during periods of economic upswing. This effect is amplified during future periods of economic recession. The magnitude of this effect is partly dependent on the sector in which a company is active, with sectors more vulnerable to economic recessions experiencing these effects more heavily. The robustness analyses in this thesis show that the magnitude of the measured recession periods do not affect the central relationship studied in this thesis.

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I. Introduction

Recent times have been tough and uncertain for the world economy. There is a lot of turmoil in the economy and high inflation rates are holding as a consequence of the Covid-19 crisis and the invasion of Ukraine (International Monetary Fund, 2023). Moreover, a potential new banking crisis may impact the economy, which could have been set off by the current economic climate. The economy risks entering a downward spiral because of this banking crisis (Seru, 2023).

This is not the first time the world economy has entered a period of crisis, take the Great Depression and the 2008 Financial Crisis. Financial crises are characterized by their broad economic effects including; a decrease in the market-wide economic growth, deflation, a decrease in world trade and investments, an increase in unemployment, a higher rate of bankruptcies and declined outlook for initial public offerings (IPOs) (Pettinger, 2020; Cerqueiro et al., 2023). Thus, these times of recessions are mostly known for their dreadful effects on households, companies, and national economies. Despite the possibility of entering a new recession, the newspapers have recently been focused on the potential upsides of such recessions and call upon success stories from previous economic downturns. Microsoft, among other major companies, was founded during a recession (Bertog, 2020). Periods of recessions can provide advantageous circumstances for companies due to less competition, better deals from suppliers, increased access to talented professionals and more opportunities to capture consumer attention (Gibbons, 2022). These advantageous circumstances can provide appealing opportunities for companies to scale up and thrive on the long run (Frick, 2019). Thus, these contradictory factors bring us to this thesis' research question: **"What are the effects of the economic conditions, recession versus non-recession, during a company's IPO on its long-term performance?".**

This research question relates to previous studies which focused on the long-term effects of a CEO's life experiences (the date of birth, years growing up, the graduation date, or the year entering the job market) on their careers (Oreopoulos et al., 2012), management styles (Malmendier et al., 2011) and company performance (Schoar & Zuo, 2017). Research is also carried out on the imprinting effects of the foundation environment on organizations (Marquis & Tilcsik, 2013). This research demonstrated that companies display imprinted characteristics from their foundation date long after their start-up phase. Moreover, studies have shown that companies are mostly imprinted by their environment during important and transitional phases, such as the foundation or IPO phase (Stinchcombe, 1965). There is less research on how these imprinted characteristics affect a firms' company performance in the long run. Therefore, this thesis will further focus on how these imprinted characteristics affect company performance. This thesis will elaborate on current research, by taking the scope of this research from a CEO level study to an organizational level study.

As mentioned, research has been conducted on what affects the formation of CEO management styles and their consequential effects on firm performance. Less is known, however, about the formation of organizational styles during the IPO phase and their effects on long-term firm performance. So, what are the (long-term) effects of the IPO conditions on company performance? To what extend do these effects differ per sector? To what extend do these effects differ for the economic conditions in the future? To what extend are these effects influenced by new IPO activity during certain economic conditions? To shed light on these questions this thesis will investigate the correlation, and the sectorial differences of this correlation, between the economic conditions in which a company went public and the company's future performance.

This thesis study finds a positive correlation between recessionary IPO conditions and company performance. Moreover, this thesis study proves that the sector in which a company

is active, has a significant influence on this correlation. Therefore, this thesis can be of use for companies in their decision whether to, and when to go public. The results from this thesis are important for policy makers, because imprinted recessionary traits, eg. cost cutting behavior, can be carried along into a period of economic upswing through businesses that went public during a recession.

The remainder of this thesis is organized as follows. In section II, a further elaboration on previous research is presented and the base for the theoretical framework is given. In section III, the data and methodology of this thesis study are presented. In section IV, the findings of the study are described. In section V, the results of this thesis are discussed. Finally, in section VI, the conclusions are drawn.

II. Literature Review

Research has been carried out on the potential benefits of recessions on organisations, while other studies investigated the disadvantages of recessions on companies. During a recession, a company enjoys less competition and can therefore capture a larger amount of customer attention, enjoy better deals from suppliers and have easier access to talented professionals (Gibbons, 2022). Another advantage for companies fostering during periods of recession is that these companies are designed to have flexible operations to react to changing customer needs. This adaptability gives these firms a competitive advantage because they can strategically place themselves in changing markets even after the economic downturn (Terjesen et al., 2015). On the other hand, recessions also have negative effects on companies. During recessions there is a decrease in customer demand for products and services (Fairlie, 2013). Consequently, it becomes harder to establish brand awareness and a large customer base, which can limit a company's growth in a later period (Moreira, 2017). It also becomes harder to initiate growth during recessions, as most growth initiatives need initial capital or a business loan from a bank (Fairlie, 2013). During recessions however, banks approve fewer loans.

Recessions have severe consequences for companies in general and on their performance specifically. To better understand the effects of recessions on companies, this thesis will elaborate on previous research by diving into the effects of recessionary IPO conditions on future company performance. This thesis is an extension of research focused on one of the following three topics. Firstly, it expands on research about IPOs and the effects of IPOs on a company's organizations and operations. Secondly, it also elaborates on studies which focused on the effects of a CEO's early life experiences on management styles and company performance. Lastly, this thesis also elaborates on previous research about the effects of imprinting on organizational structures. The rest of this section is split into three sub-sections,

which will further elaborate on these three areas of existing literature to better illustrate the current theoretical framework.

The influences of IPOs on companies

IPO stands for the Initial Public Offering, which occurs when a private company goes public for the first time. A company goes public by selling shares of their business to the general public (Stephenson Law, 2023). A company can decide to go public for multiple reasons. The most common reason is to raise capital and to grow the business (Davis, 2022). IPOs can also be used to reduce debt by raising debt free capital and thereby reducing interest costs and improving cash flows (Stephenson Law, 2023). However, IPOs are very complicated and can pose many challenges to companies. Once a company goes public all the company's details, including their financials, become publicized information. Public companies are highly regulated and inspected by governments through quarterly and yearly reports (Davis, 2022). By going public, companies give away a part of their equity to the public. This results in a loss of control and possible additional pressure on the management team to reach certain short-term performance goals, which may not align with long-term strategies (Stephenson Law, 2023).

The preparations and the executions of IPOs are very complex and time-consuming. The preparation of an IPO can take over a year, during which the company must change in multiple ways (Davis, 2022). To proceed with an IPO, a company has to reorganize their financials, tax implications, composition of the board and more (Stephenson Law, 2023). Alongside these logistical changes in the company, it is also proven that the IPO process includes organizational changes (Eije et al., 2004). These changes are the result of the IPO process which introduces new advisors, investors and analysts to the company. These new stakeholders will inspect the company and make the necessary changes to fit the new public environment as well as the current economic environment. Previous research has suggested that economic characteristics

and attributes around the IPO date can therefore influence organizational structures (Eije et al., 2004).

Recessions are known to have significant influences on companies and their performances. They also influence companies in their decision to go public or to stay private. It is proven that during financial crises both the average amount of IPOs and the size of share issuances decrease (Blum, 2011). The current banking crisis of 2023 seems to have similar effects, as the current outlook on IPOs has decreased and companies seem to have slowed down their IPO plans (Cerqueiro et al., 2023). Furthermore, recessions also seem to have an effect on the short-run market performance of IPOs. Research has proven that the 1st, 5th, 10th, 15th, and 20th day market returns of IPOs, are worse for IPOs issued during periods of economic recession (Fine et al., 2017). These effects, however, differ significantly across sectors. In most sectors IPOs have a worse short-run market return during economic recessions. In some sectors, however recession-IPOs seem to outperform IPOs from periods of economic upswing (Fine et al., 2017).

CEOs life experiences and a CEOs career and company performance

The CEO of a company is one of, if not the most influential person for a business. No matter the size or hierarchical structure of a firm, a CEO has significant influence on a company's decision-making processes, financial structures and performance. Hence, to better understand the successes and failures of a business, the differences between CEO characteristics and the effects of these differences on firm performance, is a widely researched topic. One of the well-researched characteristics of a CEO, is their early life experiences. Examples include their date of birth, societal developments during their youth and the moment they enter the job market. Malmendier et al. (2011) explored the long-term effects of growing up during an economic downturn on future CEO's behavior. They mention that people, who were born during the Great Depression and who become CEO's, have less faith in external capital markets, lean

more on internal financing, and are less likely to swap equity for debt than CEO's who are born in better economic periods. They also find that these CEO's who were born during the Great Depression are less likely to utilize debt. This leads to a significant correlation between the date of birth of a firms' CEO and a firms' capital structure (Malmendier et al., 2011).

Other related studies have focused on the long-term effects of the economic environment at labor market entry on a CEO's career, wage and management style. It has been proven that CEOs who enter the labor market during a recession, on average earn less during their whole career than similar CEOs, who entered the labor market during better economic periods (Moreira, 2017). This is explained by the fact that during recessions there are less jobs available in conjunction with the quality of jobs available decreasing. This has significant, long-lasting effects on the wages and skills of recession entrants (Moreira, 2017). The wage of an employee normally increases gradually over an individual's career (PayScale, 2022). Employees who enter the market during a worse economic climate will receive a lower initial wage. This will lead to a consistently lower overall wage during their career due to the decreased compounding effect of salary growth. Furthermore, research has shown that the skillset of a recession-entrant is lower throughout their career, resulting in a decrease in the CEO's overall wage (Moreira, 2017). This can be explained by the decrease in job quality during recessions (Moreira, 2017) and the long-lasting compounding effects of an entrant's first job on their professional development (Oyer, 2006).

Professionals entering the job market during a recession are likely to have more conservative management styles; they have lower investment rates in capital expenditures and R&D, engage more in cost cutting strategies, and have smaller financial leverage and capital needs (Schoar & Zuo, 2016). There are two channels which can explain a CEO's more conservative management style. These channels are the firm-specific channel and the general recession channel (Schoar & Zuo, 2016). During a recession there is a higher unemployment rate making

it harder for graduates to find a job. Therefore, starters might start looking for a job in less traditional places including smaller or private companies. These companies hold different norms and values, which starters will carry along into their career, therefore affecting them through the firm-specific channel (Schoar & Zuo, 2016). Moreover, during a recession, mentors and the macro environment might teach market entrants different skills and attitudes. Entrants will carry these learnt skills and attitudes into their career, hence affecting them through the general recession channel (Schoar & Zuo, 2016).

The theory of imprinting

The concept of imprinting has a broad body of literature in both animal and human psychology and is described as a sort of learning, which happens at a young age or at a particular stage of development. This learning process involves an organism recognizing certain behaviors, which are consequently 'imprinted' onto the organism and will subsequently be mirrored by the organism in future periods (New World Encyclopedia, 2023). This theory of imprinting has also been studied in other areas of research. Stinchcombe (1965) was the first to apply imprinting theory to organizational research in his paper "Social Structures and Organizations". He describes that not only organisms, but also companies, are imprinted during important phases of their lifecycle. One of the most important phases for a company is the moment of IPO, as a result companies show persistent characteristics of their IPO environment in their organizational structures and behaviors (Stinchcombe, 1965).

Due to the broad range of research on the topic across several areas, multiple definitions of 'imprinting' exist in different settings. Therefore, first a definition will be given to this term to prevent misunderstanding of the term as used in this thesis. The definition written by Marquis and Tilcsik (2013) will be used, because this interpretation was specifically designed for organizational research purposes. Their definition is given as: "*a process whereby, during a*

brief period of susceptibility, a focal entity develops characteristics that reflect prominent features of the environment, and these characteristics continue to persist despite significant environmental changes in subsequent periods" (Marquis & Tilcsik, 2013). This definition carries three important characteristics: (i) there are specific periods of time in which an focal entity is sensitive to environmental influences, (ii) environmental influences in these periods have a certain impact on the entity, which result in the entity starting to reflect this environment, and (iii) this behavior has a persistent nature and the entity will keep reflecting this environment even after the environment itself changes (Marquis & Tilcsik, 2013). These sensitive periods of time should be interpreted as periods of transition, more specifically, these are periods in an entity's life during which significant changes occur (Marquis & Tilcsik, 2013). For example, the moment of birth of an individual or the foundation of an organization, but also the moment an individual enters the job market or a private company enters the public market. These are critical transitions during which entities live in uncertainty. This may cause the entity to look at mentors or peers for guidance on how to behave in order to reduce this feeling of uncertainty (Marquis & Tilcsik, 2013). Hence, entities are highly susceptible for imprinting by environmental influences during transitional and uncertain periods (Dickel et al., 2020).

CEOs are entities which are susceptible to imprinting, especially during their early life and their first market entry. In these periods they live under high levels of uncertainty and are therefore more receptive to learn from the external environment (Marquis & Tilcsik, 2013). Once the transition period has ended and an individual enters a phase of certainty, they tend to become less receptive to learn from the external environment. This results in the persistent, imprinted behavior of an individual (Marquis & Tilcsik, 2013). Studies of Schoar & Zuo (2011) and Malmendier & Nagel (2011) showed that individuals who grew up or entered the job market during recessions, show clear characteristics of recession style management in their own management styles. These recession-CEOs are more conservative in their decision

making, are less likely to take on debt and are more likely to be focused on cost-cutting strategies. In short, these recession-CEOs have a different skill- and mindset than non-recession CEOs (Schoar & Zuo, 2011; Malmendier & Nagel, 2011).

Much like individuals, organizations go through phases of uncertainty. They also seem to suffer from anxiety caused by uncertainty, making them susceptible to imprinting. Moreover, companies are shaped by the historical environment during these transitional phases. Organizations tend to reflect the environment in which they went public (Stinchcombe, 1965). This is because companies are designed to fit a specific existing environment. After entering the public market, the economy might change but companies are more likely to stick with what they do, than to learn and adapt to a changing environment; at least not at the core of the company (Johnson, 2007). The most logical explanation for this is that organizations become less susceptible for environmental changes once they have established a feeling of certainty. Organizations carry not only a specific mindset from their foundation date, but also economic, technological, geographical, and institutional conditions, from the foundation environment, can be recognized companywide years later (Marquis & Tilcsik, 2013). The effects are strengthened by new entrants in the market, which partially copy market leaders' behavior. Therefore, if a certain industry has expanded during a specific economic period, new entrants in the market can still show some characteristics from previous economic periods, through imprinted behavior copied from market leaders (Marquis & Tilcsik, 2013).

In conclusion, companies are structurally imprinted by the economic environment during transitional phases (Stinchcombe, 1965). This has significant influence on a firm's operations and structures because they are reluctant to change these in later periods (Marquis & Tilcsik, 2013). However, there is no further research on the effects of these imprinted characteristics on future company performance, therefore this will be the scope of this thesis.

Hypotheses

Based on previous research multiple assumptions can be made, which lead to this thesis' research questions and hypotheses. It can be assumed that companies that manage to kick-off their IPO successfully during a recession can have bright futures (Terjesen et al., 2015), CEOs are imprinted by early life experiences, and this has significant influences on future company performance (Schoar & Zuo, 2017). Moreover, it can be assumed that companies can display imprinted characteristics from the moment they entered the public market (Johnson, 2007). Therefore, the main research question analyzed in this thesis is: **"What are the effects of the economic conditions, recession versus non-recession, during a company's IPO on its long-term performance?".** This will be extended by the following research question: **"What are the sectorial differences for the effects of the economic IPO conditions on company performance?"**. To answer these research questions, the following hypotheses are drafted:

> ***H1.*** *There is a positive correlation between the recessionary IPO conditions of a company and long-term company performance.*

For this hypothesis, IPO conditions are defined as recessionary if the date of the IPO falls within a period, which is classified as a recessionary period by the National Bureau of Economic Research. Moreover, the long-term company performance is measured by a company's ROA and ROE.

If hypothesis 1 is true and there is a positive correlation between recessionary IPO conditions and company performance, this effect might be strengthened in future periods of recession. From the literature review it is known that companies that scale up during recessions can develop a competitive advantage due to their flexible operations, which are designed to react to changing customer demand (Terjesen et al., 2015). This competitive advantage can be beneficial for firms, especially during future recessions. Therefore, this thesis assumed that the

positive correlation tested in H1 is amplified during future periods of recession. This assumption was tested with the following hypothesis:

> ***H1.****a. There is a positive correlation between the recessionary IPO conditions of a company and company performance, which is increased in future periods of economic recession.*

The variance of a company's profit is shaped by sector characteristics for 23.5% (Bamiatzi et al., 2015). Moreover, sector effects are stronger during periods of decline (Bamiatzi et al., 2015). To research the IPO conditions' effect on firm performance it is crucial to have a solid comprehension about the variance of these economic effects across sectors. Recessions have broad economic effects, yet these vary per sector (Pettinger, 2020). While most sectors will endure a decline in economic growth, some might not endure any differences, while other sectors even prosper during recessions (Bamiatzi et al., 2015). Therefore, it can be assumed that sectors react differently to recessions and that the correlation between recessionary IPO conditions and firm performance differ per sector. This will be tested with the following hypothesis:

> ***H2.*** *There is a significant variance in the correlation between recessionary IPO conditions and company performance if measured independently across sectors.*

To better understand the results of *hypothesis H2*, *hypothesis H2a.* and *hypothesis H2b* are drafted. H2.a. and H2.b. will focus on a sector's sensitivity to recessions as investigated by previous papers. According to Jiang et al. (2009) there are certain sectors which are positively affected by recessions and there are certain sectors that are severely negatively affected by recessions. In general, the health care sector and the consumer staples sector are fairly resistant to recessions, while the consumer discretionary, materials, energy and industrial sectors in general incur the sharpest drop (Jiang et al, 2009). The remaining sectors, information

technology, communication services, utilities and real estate, also incur negative effects from the recessions, yet not as sharp as the sectors mentioned before. These general trends are used as input for the categorization of two sub-samples, in order to research whether the results of H2 are sector specific or that they are the result of a sector's sensitivity to recessions. The first sub-sample, tested by H2.a. includes all sectors that are not, or positively, affected by recessions. This sub-sample includes the health care and consumer staples sector. The second sub-sample, tested by H2.b. includes all sectors that are negatively affected by recessions. This sub-sample therefore includes the energy, materials, industrials, consumer discretionary, information technology, communication services, utilities and real estate sectors. To investigate the influence of a sector's recession sensitivity on the correlation between the IPO environment and the company performance the following two hypotheses will be tested:

> ***H2.****a. Sectors that are not, or positively, affected by recessions have a negative correlation between recessionary IPO conditions and company performance.*

> ***H2.****b. Sectors that are negatively affected by recessions have a positive correlation between recessionary IPO conditions and company performance.*

Recessions can have both positive or negative influences on IPO activity (Fine et al., 2017). It is proven that economic recessions influence sectors differently (Jiang et al., 2009). Therefore, the correlation between recessionary IPO conditions and the long-term company performance as investigated in this thesis, could be influenced by the IPO activity across sectors during recessions. To better comprehend the correlation between recessionary IPO conditions and long-term company performance, the assumption that IPO activity is also correlated to recessionary economic conditions was tested with the following hypothesis:

> ***H2.****c. There is a significant variance in correlation between IPO activity and recessionary economic conditions if measured independently across sectors.*

III. Data & methodology

This thesis will elaborate on previous research by testing the long-term effects of an company's IPO experience on future company performance. In order to answer the research questions and test the hypotheses, three datasets were combined. Two of which are collected through the Wharton Research Data Services Data Base. One dataset is offered by WRDS Beta itself and gives the time series of monthly financial ratios per company. This dataset provides data on company profitability and performance. The other WRDS data is offered by Compustat's Capital IQ Standard Poors database. This data set also offers insights on annual financial fundamentals and financial structures of companies in the United States. The third data set is collected through the National Bureau of Economic Research, which classifies economic periods as periods of recession or of non-recession. Hence, this data set is used to determine whether the IPO date of a company falls within a recession or non-recession period.

One of the data sets only offers data of companies from the United States, therefore this will be the target population for the research. This thesis will research the IPO date of companies, therefore the data set will only include public companies. There is still a lack of understanding about the economic consequences of the Covid-19 crisis, therefore this period will be excluded from the data sample. The time frame for this thesis study is from 1970 until 2019.

The first two data sets are combined using the *gvkey* company identifier. The monthly observations of the panel data have been reduced to quarterly data because all ratios offered by the data set only changes quarterly. Lastly, outliers are removed from the dataset to reduce measurement errors. The remaining data set includes 255590 observations from 4891 companies.

Research design

To analyze the imprinting effects caused by the IPO environment on company performance, a Mixed Effect ML-regression will be used. It is necessary to consider both fixed and random effects, due to the used panel data set which includes time-series, thus the Mixed Effect ML-regression is used. In the regression the *company performance* will be the dependent variable and the *IPO environment* will be the independent variable. A distinction will be made between firms that went public during recessions and firms that went public during periods of economic upswing. The future company performance of these sub-samples will be measured independently. The regression will also feature control variables to correct for other factors that have an influence on company performance.

Variables

For the regression, multiple dependent, independent and control variables are used. All variables including formulas, notations and descriptions are reported in *Table 1. Variables Summary* below.

Table 1. *Variable summary*

Variable	Variable notation	Type of data	Regression element	Measure	Variable format	Description
IPO condition	$\beta_x IPOCon$	*Binary / Dummy*	Independent	The economic environment at the IPO date	0 or 1	A company whose IPO date falls within an economic recession will have a numerical value of 1. A company, whose IPO date does not fall within an economic recession will have a numerical value of 0.
Economic Condition	$EcoCon$	*Dummy*	Dependent	The economic environment at the measured date	0 or 1	A measured date which falls within an economic recession will have a numerical value of 1. A measured date which does not fall within an economic recession will have a numerical value of 0.
Company performance	$Y_{c,t}$	*Continuous*	Dependent	$ROA = \frac{Net\ Income}{Total\ Assets}$ & $ROE = \frac{Net\ income}{Shareholder's\ Equity}$	%	Company performance is defined as the correlation between the output established from the input of resources employed and measures how successfully a company can use it's inputs to establish outputs.
Sector	$\beta_x Sector$	*Nominal*	Independent / Control	Categorical breakdowns between sectors	Number	Sector breakdowns according to the GICS (Global Industry Classification Standard).
Sector Group	$\beta_x Sectorgroup$	*Nominal*	Independent	Categorical breakdowns between sector groups	Number	Sector group breakdowns according to previous research on the effects of recessions on sector performance.
IPO activity	$Y_{c,s,t}$	*Discrete*	Dependent / Confounding	Number of companies that have gone public	Number	The number of IPOs that occurred during a certain calendar year.
Company Public Years	$\beta_x Public\,Years$	*Continuous*	Control	$Current\ year - IPO\ year$	Number	The number of years since a company's IPO.

Company size	$\beta_x Size$	*Continuous*	Control	Enterprise value	€	The size of a company's total value.
Geographical location	$\beta_x Location$	*Nominal*	Control	Categorical breakdowns between states by State ID	Text	Geographical, physical location, where operations take place.
Company liquidity	$\beta_x Liquidity$	*Continuous*	Control	$Cash\ ratio = \frac{Cash + cash\ equivalents}{Current\ Liabilities}$	x	The company's ability to convert its assets to cash to meet their short-term liabilities.
Company leverage	$\beta_x Leverage$	*Continuous*	Control	$Capitalization\ ratio = \frac{Debt}{(Debt + Equity)}$	%	The amount of debt a company has, compared to the total capital a company holds.
Year	$\beta_x Year$	*Dummy*	Control	The year in which the observation is measured	Number	The designated fiscal year during which the company's performance is measured.

Dependent variables

This thesis will study the effects of the economic environment during IPO on *company performance*. To measure *company performance*, Return on Assets (ROA) and Return on Equity (ROE) will be used. To ensure the precision of the model a collinearity test is run on both statistics. The two variables have a mean variance inflation factor (VIF) of 1.86, thus it is worthwhile to study both statistics.

Independent variable

For the independent variable this thesis will use the economic *IPO environment* of an organization. The IPO environment will be based on the IPO date and the economic environment at that date. The IPO date will be given a numerical value. For example, a company that went public during an economic recession will be coded as 1 and firms that went public during an economic upswing will be coded as 0, through this method the sample will be split into two sub-samples. To classify a period as a recession or a non-recession period, the business cycle dating database of the National Bureau of Economic Research (NBER) will be used. The NBER classifies recession periods based on the economic business cycles in the United States. A recession period is the period which starts after the peak of an economic business cycle and ends at the trough (NBER, 2023). The coding will be approached with a similar design as in the research by Schoar & Zuo (2016). A year will be coded as a recession

year when the (calendar) year fully falls into a recession period or includes the trough of a business cycle (Schoar & Zuo, 2016).

Control variables

To ensure the effect measured by the regression model is purely the effect of the independent variable on the dependent variable, the model will control for several environmental and market level factors that might influence the dependent variable: *company performance*. Variables for which the regression will control are company size, the number of years since the IPO (Pastusiak et al., 2016), company's leverage (Knanam et al., 2014), and company's liquidity on an organizational level (Terjesen et al., 2016). On a market level the regression will be controlled for sector and geographical region (Fairlie, 2013). Lastly, the regression models are controlled for year effects to capture any time-related effects, which might influence company performance.

Regression models

Hypotheses 1 and 1a index a company (*c)* with a quarterly time frame (*t).* Hypothesis 2 index company *(c)* within specific sector (*s)* with a quarterly time frame (*t)*. Hypotheses 2a and 2b index company *(c)* within sector group *(g)* with a quarterly time frame *(t).* Hypothesis 2c index company *(c)* within specific sector (*s)* with a yearly time frame (*t)*. All regression models have clustered the robust standard errors (ε) to deal with heteroskedasticity issues.

Hypothesis 1.

In this hypothesis, the *company performance* ($Y_{(c,t)}$) is measured by testing the ROA and the ROE. Both statistics are tested with the following regression model:

$$\boldsymbol{Y}_{(c,t)} = \alpha + \beta_1 IPOCon + B_2 PublicYears + B_3 \ln(Size) + B_4 Location + B_5 Liquidity + B_6 Leverage + B_7 Year + \varepsilon$$

Here, $Y_{(c,t)}$ is the *company performance component*, which is the dependent variable. The independent variable is $\beta_1 IPOCon$, which illustrates the economic condition in which a company went public. The control variables are represented by $B_2 PublicYears$, $B_3 Size$, $B_4 Location$, $B_5 Liquidity$, $B_6 Leverage$, $B_7 Year$. The model controls for the number of years since the IPO, because future company performance is severely influenced by its IPO (Pastusiak et al., 2016). Evans (1987) found an correlation between company performance and firm size; profitability decreases at a diminishing rate with firm size, therefore this regression controls for firm size. The regression also controls for location, because the geographic location of a company may have significant influences on company profitability (Nguyen et al., 2011). Moreover, liquidity and profitability are correlated to each other, thus making it necessary to control for company liquidity (Gill, 2022). Leverage has a proven significant correlation with profitability and will therefore be controlled for (Salah & Elewa, 2018). There will be controlled for time-year effects, to ensure that the results from the regression are not influenced by the general year effects on company performance (Houthoofd & Hendrickx, 2012).

Hypothesis H1.a.

For hypothesis H1.a. a similar regression model is used. To test whether the results in H1 are strengthened by future economic conditions, a variable of the future economic condition and an interactivity test are included. The following regression model is drafted:

$$\boldsymbol{Y}_{(c,t)} = \alpha + \beta_1 IPOCon + EcoCon + \beta_1 IPOCon * EconomicCondition + B_2 PublicYears + B_3 \ln(Size) + B_4 Location + B_5 Liquidity + B_6 Leverage + B_7 Year + \varepsilon$$

$Y_{(c,t)}$ is the *company performance* component, which is measured by ROA and ROE. Another dummy variable is added to the regression model: the $EconomicCon$. This dummy illustrates the economic condition at the date of measurement. Moreover, the interaction effect tests for

the IPO condition and the tested economic condition is included in the form of $\beta_1 IPOCon * EconomicCondition.$

Hypothesis H2.

Here, $Y_{(c,s,t)}$ is the *company performance* component, which is measured by ROA and ROE. It will be tested across sectors (*s)* to investigate whether the positive correlation from H1 differs significantly across sectors. Therefore, the regression model to test this hypothesis is specified with the following equation:

$$\boldsymbol{Y}_{(c,s,t)} = \alpha + \beta_1 IPOCon + B_2 PublicYears + +B_3 \ln(Size) + B_4 Location + B_5 Liquidity + B_6 Leverage + B_7 Sector + B_8 Year + \varepsilon$$

In the regression model, the control variable for sector, $B_7 Sector$, is added.

Hypothesis H2.a. & Hypothesis H2.b.

For hypothesis H2.a. and H2.b. the data will be tested across two sector group. One sector group includes all sectors that are not, or positively, affected by economic recessions: health care and consumer staples The other sector group includes all sectors that are negatively affected by economic recessions: energy, materials, industrials, consumer discretionary, information technology, communication services, utilities and real estate. To test for these sector groups, the following regression is used:

$$\boldsymbol{Y}_{(c,g,t)} = \alpha + \beta_1 IPOCon + B_2 PublicYears + +B_3 \ln(Size) + B_4 Location + B_5 Liquidity + B_6 Leverage + B_7 SectorGroup + B_8 Year + \varepsilon$$

Here, $Y_{(c,g,t)}$ is the *company performance* component, which is measured by ROA and ROE and is indexed by the group of sectors *(g)* in which company *(c)* is active: $B_7 SectorGroup$.

Hypothesis H2.c.

To test whether there is a significant variance across sectors for the correlation between IPO activity and economic conditions, the following regression equation is used:

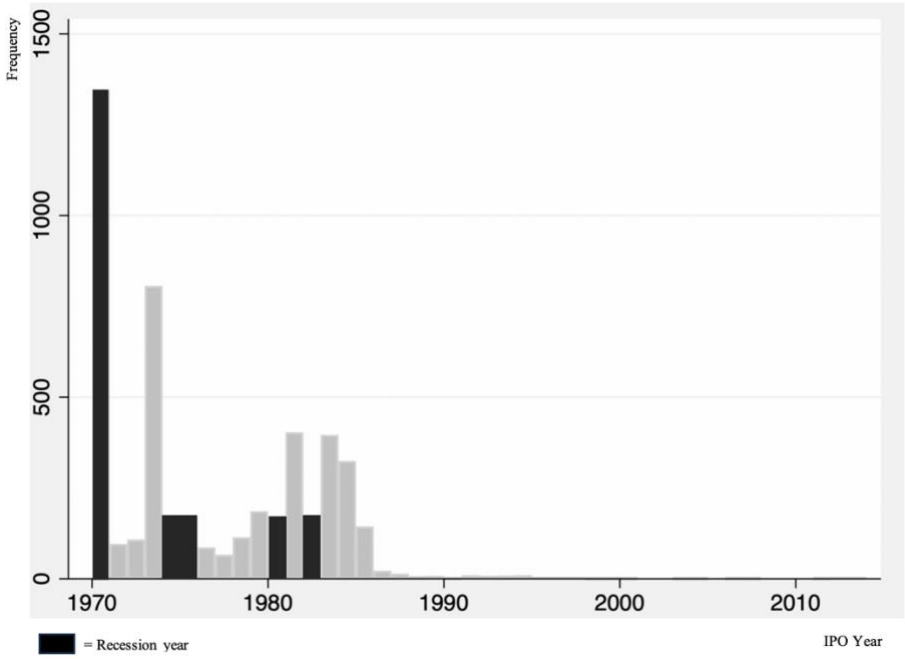
$$\boldsymbol{Y}_{(c,s,t)} = \alpha + \beta_1 EcoCon + \beta_2 Sector + \beta_1 EcoCon * \beta_2 Sector + \beta_3 Year + \varepsilon$$

Here, $\boldsymbol{Y}_{(c,s,t)}$ is the number of new companies that went public *(c)* by sector *(s)* per year *(t)*. A test for the interaction effect between the economic condition and the tested sectors is included: $\beta_1 EcoCon * \beta_2 Sector$. This interactivity test is added to measure what the actual sectorial effects are. Moreover, there will be controlled for time-year effects, to ensure that the results from the regression are not affected by the general year effects on IPO activity (Batnini & Hammami, 2015).

IV. Results

The data set used includes 4891 companies. Of these companies, 2046 went public during a recession and 2845 went public during periods of economic upswing. Periods of recession, however, are typically shorter than periods of economic upswing. Hence, it is not necessarily proven that fewer companies go public during recessions. To further investigate the IPO activity across recession and non-recession years, the data set is sorted by the number of firms going public in a specific year, in figure 1.

Figure 1. *Frequency histogram: IPOs per year*



In figure 1, a significant peak in IPO activity in 1970 is noticed. A possible explanation for this peak, can be the IPO wave that provided the highest IPO activity thus far in 1969 (Gompers & Lerner, 2003). Therefore, the IPO activity was probably still high in 1970. The data set provides a lot of observations from companies that had their IPO in 1970. However, this might lead to a biased data set, therefore the regressions from this study have also been repeated with a data set that excluded the companies that went public in 1970.

To gain a better understanding of the correlation between IPO activity and recessionary economic conditions and the influence of this correlation on company performance, a descriptive statistical analysis is performed on all variables.

Table 2. *Descriptive Statistics Summary*

Variable	Observations	Mean	Standard dev.	Min.	Max.
Company performance (ROA)	N= 255590 *n=4891*	**0.14**	0.12	-1.54	1.28
Company performance (ROE)	N= 255590 *n=4891*	**0.09**	0.20	-2.98	2.88
Economic condition	N= 255590 *n=4891*	**0.20**	0.40	0	1
IPO condition	N= 255590 *n=4891*	**0.52**	0.50	0	1
Company public years	N= 255590 *n=4891*	**27.94**	14.13	0	48
Company size (Enterprise value)	N= 255590 *n=4891*	**4525600**	2.24e+7	0	1.25e+9
Company liquidity (Current ratio)	N= 255590 *n=4891*	**2.46**	2.00	0	24.98
Company leverage (Capitalization ratio)	N= 255590 *n=4891*	**0.28**	0.21	0	1

Table 2 presents the descriptive statistics summary. The mean of the *IPO condition* is 0.52, which means 52% of the companies have gone public during periods of economic upswing, while the other 48% have gone public during recessions. The mean of *Economic Condition* is 0.20. Thus, over the timeframe of the data set, 80% of the observations are from periods of economic upswing and only 20% of the observations are from recessionary periods. These two statistics combined could indicate that *IPO activity* is positively affected by periods of economic recession. This relation will be further explored in the regression for hypothesis H2c.

In order to test if noticeable differences exist between the companies that went public during recessions and companies that went public during economic upswings, the data sample is split into two groups. The table below features the descriptive statistics of companies in the two sub-samples: companies that went public during economic upswing and companies that went public during recessions. To gain a better understanding about the statistical differences between the two samples, t-tests were performed.

Table 3. *Descriptive Statistics of the sub-samples & T-test statistics*

		Companies with upswing IPO	Companies with recession IPO	T-Test statistics
Observations		N= 122136 n= 2845	N= 133454 n= 2046	
Variable				**Mean Differences**
Company performance (ROA)	**Mean**	**0.137**	**0.143**	**-0.006*** **
	St.Dev.	*0.145*	*0.098*	
	Min.	*-1.54*	*-1.1*	
	Max.	*1.28*	*1.03*	
Company performance (ROE)	**Mean**	**0.075**	**0.100**	**-0.024*** **
	St.Dev.	*0.223*	*0.169*	
	Min.	*-2.98*	*-2.89*	
	Max.	*2.74*	*2.88*	
Economic condition	**Mean**	**0.182**	**0.219**	**-0.038*** **
	St.Dev.	*0.386*	*0.414*	
	Min.	*0*	*0*	
	Max.	*1*	*1*	
IPO condition	**Mean**	**0**	**1**	**-**
	St.Dev.	*0*	*0*	
	Min.	*0*	*1*	
	Max.	*0*	*1*	
Company public years	**Mean**	**24.901**	**30.712**	**-5.812*** **
	St.Dev.	*13.329*	14.279	
	Min.	*0*	*0*	
	Max.	*47*	*48*	
Company size (Enterprise value *$m*)	**Mean**	**2124009**	**6723516**	**-4599507*** **
	St.Dev.	*9426112*	*2.953+07*	
	Min.	*0*	*0*	
	Max.	*7.54e+08*	*1.25e+09*	
Company liquidity (Current ratio)	**Mean**	**2.673**	**2.262**	**0.411*** **
	St.Dev.	*2.265*	*1.706*	
	Min.	*0*	*0*	
	Max.	*24.975*	*24.971*	
Capitalization ratio	**Mean**	**0.254**	**0.307**	**-0.053*** **
	St.Dev.	*0.219*	*0.207*	
	Min.	*0*	*0*	
	Max.	*0.999*	*1*	

A two-tailed t-test is performed, demonstrating the differences between means. *** denote significance at the 1% level. Correlation tests were run between the variables, to measure whether the control variables would add value to the regressions. The control variables did not correlate significantly, hence it is valuable to control for all variables in the table. Thus, they are all used in the regression models.

From the descriptive summary of the sub-samples, some initial variations are spotted. The ROA and ROE are significantly higher for the sub-sample of companies that went public during recessions, supporting hypothesis H1. This indicates a variance in company performance between companies that went public during economic recessions and companies that went public during periods of economic upswing. Moreover, other descriptive statistics, including company public years and size, also differ between the two sub-samples.

From the t-tests it is interpreted that there are significant differences ($P(|T| > |t|) = 0.000$) between the company performance, -0.006 and -0.024, of the companies in the two sub-samples. The descriptive statistics and t-tests are followed up with the mixed-effects ML-regressions. The regressions are repeated for ROA and ROE as the dependent variable for *company performance*. The independent variable is *IPO condition*, a dummy variable for the economic condition during the IPO of a company. The first regression model includes the

control variables; company public years, company size, current ratio (liquidity), capital ratio (leverage) and location. The results from the regressions are shown below in table 4.

Table 4. *Regression results Company Performance – IPO condition*

	ROA		ROE	
	Coefficient	**Std. err.**	**Coefficient**	**Std. err.**
IPO condition	**.025*** (0.000)**	**.004**	**.037*** (0.000)**	**.006**
Company public years	.001*** (0.000)	.000	.002*** (0.000)	.000
Log company size	.004*** (0.000)	.000	.005*** (0.000)	.000
Current ratio	-.003*** (0.000)	.000	.004*** (0.000)	.000
Capital ratio	-.083*** (0.000)	.001	-.112*** (0.000)	.002
Location dummy incl.	Yes	Yes	Yes	Yes
Observations	*N = 249437, n =4623*			

P-value in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. To check for robustness, the model above has been rerun multiple times to ensure accuracy of the results The regression model was rerun without the company public years variable, with the quick ratio instead of the current ratio as liquidity measure and with the Debt-Equity ratio instead of capital ratio as leverage measure. The regression was repeated with recession depth instead of IPO conditions as the independent variable. Moreover, the companies that went public in 1970 were excluded from the data set, after which the regressions were rerun. All regression runs gave similar significant results; hence the above table is believed to show significant and robust results.

The results from the regressions suggest that the ROA of a company that went public during a recession is on average 2.5% (p=0.000) higher than the ROA of companies that went public during better economic periods. When the regression is rerun with ROE as the measure of company performance, the results indicate that the ROE of companies that went public during recessions is 3.7% (p=0.000) higher than of similar companies that went public during better economic periods.

To further evaluate H1 and the correlation between IPO conditions and company performance, we add a year dummy to the regression model. The new results are presented on the next page in table 5.

Table 5. *Regression results Company Performance – IPO condition including a year dummy*

	ROA		ROE	
	Coefficient	**Std. err.**	**Coefficient**	**Std. err.**
IPO conditions	**.011*** (0.000)**	**.004**	**.022*** (0.000)**	**.005**
Company public years	.002*** (0.000)	.000	.003*** (0.000)	.000
Log company size	.004*** (0.000)	.000	.005*** (0.000)	.000
Current ratio	-.003*** (0.000)	.000	.004*** (0.000)	.000
Capital ratio	-.068*** (0.000)	.001	.097*** (0.000)	.002
Location dummy incl.	Yes	Yes	Yes	Yes
Year dummy incl.	Yes	Yes	Yes	Yes
Observations	*N = 249437, n =4623*			

P-value in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. To check for robustness the model above has been rerun with a decade dummy instead of a year dummy. The model including decade dummies, instead of year dummies, gave similar significant results. Moreover, the year and decade dummy have also been rerun with recession depth as the independent variable which presented comparable results. Hence, the above results are proven to have significant and robust results. For this regression the outlier, year 1970, was excluded from the data set, after which the regressions were rerun. The results gave slightly lower correlation coefficients, yet still positive and significant. Thus, the results from the regressions are believed to be robust for outliers in the data set.

Table 5 suggests that the company performance of firms that went public during recessions is higher. The ROA of companies that went public during recessions is on average 1.09% (p=0.008) higher than of those that went public during periods of economic upswing. While the second column indicates that the ROE of companies that have gone public during recessions is on average 2.22% (p= 0.000) higher. Therefore, H1 is accepted and it is assumed that long-term company performance improves for companies that to public during recessions.

Subsequently, the regressions are rerun with an interaction term. This interaction term is added to comprehend whether the correlation found in the previous regressions, is stronger during future periods of recession. Thus, this regression explores whether the company performance of firms that went public during economic recessions is further improved during future periods of recession. The results from the regression are presented in table 6.

Table 6. *Regression results Company Performance – IPO condition including the interaction test*

	ROA		ROE	
	Coefficient	**Std. err.**	**Coefficient**	**Std. err.**
IPO conditions	**.012*** (0.003)**	**.004**	**.024*** (0.000)**	**.005**
Economic conditions	.080*** (0.000)	.003	.0314*** (0.000)	.005
Interactivity test	-.005*** (0.000)	.000	-.007*** (0.000)	.002
Company Public Years	.002*** (0.000)	.000	.0030408*** (0.000)	.000
Log company size	.004*** (0.000)	.000	.005*** (0.000)	.000
Current ratio	-.003*** (0.000)	.000	.0041*** (0.000)	.000
Capital ratio	-.068*** (0.000)	.001	-.097*** (0.000)	.002
Location dummy incl.	Yes	Yes	Yes	Yes
Year dummy incl.	Yes	Yes	Yes	Yes
Observations	N=249437, n=4623			

P-value in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. As a robustness check, the model above has been rerun with the recession depth as the independent variable, which gave comparable results. Likewise, the regression has been repeated with the dataset, which excludes all companies that have gone public in the year 1970. This regression gave slightly lower results, yet still positive and significant results, on the 10% level. Hence, the above results are proven to have significant and robust results.

Table 6 suggests that company performance is higher for firms that went public during recessions. The ROA of companies that went public during recessions is 1.20% (p=0.003) higher and the ROE is higher by 2.37% (p=0.000) than of those firms that went public during periods of economic upswing. Hence, H1a is accepted meaning that company performance of companies that go public during recessions is higher than performance for companies that go public during better economic periods. Additionally, the companies that go public during recessions perform even better during future periods of recessions.

Thereafter, the regressions are rerun including the sector control variable. This control variable is added to test for H2 and measures whether the found correlation is influenced by sector characteristics. The results from the regressions are presented in table 7.

Table 7. *Regression results Company Performance – IPO condition including sectors*

	ROA		ROE	
	Coefficient	**Std. err.**	**Coefficient**	**Std. err.**
IPO conditions	**.004 (0.436)**	**.005**	**.015** (0.019)**	**.006**
Company Public Years	.003*** (0.000)	.000	.004*** (0.000)	.000
Log company size	.004*** (0.000)	.000	.005*** (0.000)	.000
Current ratio	.003*** (0.000)	.000	.005*** (0.000)	.000
Capital ratio	.064*** (0.000)	.001	-.094*** (0.000)	.003
Sector				
Energy	.015 (0.198)	.012	.037** (0.019)	.016
Materials	.020** (0.046)	.010	.064*** (0.000)	.013
Industrials	.032*** (0.001)	.010	.065*** (0.000)	.013
Consumer Discretionary	.038*** (0.003)	.0129	.090*** (0.000)	.017
Consumer Staples	-.049*** (0.000)	.011	-.019 (0.226)	.015
Health Care	-.021 (0.127)	.014	.056*** (0.003)	.019
Information Technology	-.004 (0.734)	.011	.015 (0.309)	.014
Communication services	.047** (0.017)	.020	.091*** (0.000)	.026
Utilities	-.007 (0.636)	.014	.068*** (0.000)	.018
Real estate	-.042 (0.208)	.033	-.020 (0.650)	.044
Location dummy incl.	Yes	Yes	Yes	Yes
Time year Dummy incl.	Yes	Yes	Yes	Yes
Observations	*N= 223673, n= 3513*			

P-value in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. To check the robustness of the model, the regression has been repeated with an industry dummy instead of the sector dummy; this regression's results were similar and significant to the results above. Moreover, the independent variable has also been tested as the recession depth variable, which gave comparable results. Subsequently, the companies that went public in 1970 were excluded from the data set and the regressions were rerun. The results gave slightly lower correlation coefficients, yet still positive and significant. Therefore, the results from the regression are believed to be robust.

The results from table 7 show a significant correlation. The correlation coefficient of ROE proves that companies that went public during recessions, on average, have a ROE which is 1.49% (p=0.019) higher than the ROE of firms that went public during periods of economic upswing. Furthermore, this study investigates the sectorial effects and whether some sectors' performance is more sensitive to the economic conditions at IPO. H2 predicts that the correlation between IPO conditions and company performance differs significantly across sectors. This is supported by the regression model, which' results are wide ranged with

coefficients varying from -0.045 (p=0.000) and +0.051 (p=0.017). These sectorial differences can be due to a sector's recession sensitivity. As mentioned in the literature review, sectors such as health care and consumer staples are less affected by recessions and have a negative correlation coefficient. However, this explanation does not hold for the real estate sector. This low coefficient could be the result of the low amount of observations in the data set for this specific sector (N=1030, n=17). This also explains the statistical insignificance of the result (p=0.208). For the materials, financial and the utilities sectors it is yet unclear why the results are insignificant, but for these sectors there does not seem to be a correlation between the dependent and independent variable. While, for the other sectors there are significant correlations. Hence, H2 can be accepted, as there are significant differences between the sector's correlation coefficients. However, this study cannot draw any conclusions about the correlation between IPO conditions and company performance for all specific sectors. Subsequently, the regression is also performed with ROE as dependent variable and this regression supports H2; the results show wide-ranged correlation coefficients varying from -0.005 (p=0.650) to +0,106 (p=0.000). Again, a negative correlation is found for the consumer staples sector. The real estate sector has an insignificant negative correlation, this can be explained by the low number of observations. There is no clear explanation for the insignificant correlation for the information technology sector (p=0.309).

To better understand the influence of sector's characteristics on the correlation between IPO conditions and company performance, the sample is split up into two sub-samples: sectors which are sensitive to recessions and sectors which are insensitive to recessions. These sub-samples are based on a previous study by McKinsey (Jiang et al., 2009). The health care and consumer staples sector are assigned to the sub-sample of insensitive sectors, while the other sectors are assigned to the sensitive sub-sample. The regressions are rerun, and the results are presented below in table 8.

Table 8. *Regression results Company Performance– IPO condition inc. sector group dummy*

	ROA		ROE	
	Coefficient	**Std. err.**	**Coefficient**	**Std. err.**
IPO conditions	**.009****	**.004**	**.020*****	**.005**
Sector group 0	**(0.032)**		**(0.000)**	
Sector group 1	**-.040*****	**.006**	**-.040*****	**.008**
	(0.000)		**(0.000)**	
Company Public Years	.002	.000	.003***	.000
	(0.000)		(0.000)	
Log company size	.004***	.000	.005***	.000
	(0.000)		(0.000)	
Current ratio	-.003***	.000	.004***	.000
	(0.000)		(0.000)	
Capital ratio	-.068***	.001	-.097***	.002
	(0.000)		(0.000)	
Location dummy incl.	Yes	Yes	Yes	Yes
Year dummy incl.	Yes	Yes	Yes	Yes
Observations	*N=249437, n=4623*			

P-value in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively. As a robustness check the model above has been rerun with the recession depth as the independent variable. The regression was also repeated with the 1970 outlier being excluded from the data set. Both regressions gave comparable results. Hence, the above results are proven to be significant and robust.

The regressions provide significant results supporting H2a and H2b, the correlations are stronger for ROE than for ROA. As presented in the table above, the regressions show a correlation between the IPO condition and company performance, measured by ROA, of 0.009 (p=0.032) for companies that are sensitive to recessions and a correlation of -0.039 (p=0.000) for companies that are insensitive to recessions. Thus, companies that are active in sectors that are sensitive to recessions and go public during recessions will have a 0.1% higher ROA on average than similar companies that went public during better economic periods. While companies in sectors that are insensitive to recessions and go public during a recessionary period have an ROA which is 3.9% lower compared to similar companies that went public during better economic periods. Similar results are found when company performance is measured by ROE. There is a positive correlation between the company performance and IPO conditions of .020 (p=0.000) for companies that are active in recession-sensitive sectors and go public during recessions. While companies that are active in recession-insensitive sectors and go public during recessions have a negative correlation of -0.019 (p=0.000). Hence, companies from recession-sensitive sectors that go public during recessions have an ROE which is 2.0% higher than the ROE of similar companies that go public during better economic

periods. While companies that are active in recession-insensitive sectors perform on average -1.9% worse when they go public during recessions compared to similar firms that went public during better economic periods. The correlation coefficients from these regression are higher than the coefficients from the previous regressions, shown in table 7, which made a distinction between sectors. An explanation for the higher coefficient is that the correlation is partially fueled by a sector's sensitivity to recessions in general, because the regression allows to measure this sector sensitivity. Therefore, H2, H2a and H2b are supported, since the correlation differs significantly across sectors, which is partially due to a sector's sensitivity to recessions. Moreover, recession-insensitive sectors show a negative correlation while recession-sensitive sectors show a positive correlation coefficient.

For the last hypothesis, the combined data set is used. However, the structure of the data set is changed to design a panel data set which is split up by year and by sector. This new data set includes 495 observations, over 45 years, across 11 sectors, each year. The descriptive statistics of this new data set are presented in table 9 and 10.

Table 9. *Descriptive statistics IPO activity and economic conditions*

Variable	Observations	Mean	Standard Dev.	Min	Max
IPO activity	*N= 495* *N=11*	**7.154**	20	0	221
Economic Conditions	*N= 494* *N=11*	**.200**	.401	0	1

Table 10. *Sub-sample descriptive statistics & t-test IPO activity and economic conditions*

		Economic upswing	Economic recessions	T-Test
Observations		N=495 N = 11	N= 494 N= 11	
Variable				**Mean difference**
IPO activity	**Mean** *St. Dev.* *Min.* *Max.*	**5.457** *15.295* *0* *114*	**13.870** *32.654* *0* *221*	**-8.486*****

P-value in parentheses. *** denote significance at the 1% level.

Table 10 presents the descriptive statistics and t-test from the two sub-samples. The mean of the IPO activity per year per sector is twice as high during periods of recessions than during periods of economic upswing, 13.870 versus 5.457 respectively. Furthermore, the two-tailed t-

test gives a value of -8.486 (p=0.000), therefore it is assumed that there are significant differences between the IPO activity amid different economic conditions. To further comprehend the correlation, the t-test is followed up with a regression. The results of this regression are presented in table 11.

Table 11. *Regression model IPO activity – Economic conditions*

IPO activity	**Coefficient**	**Std. err.**
Economic conditions	**74.480*** (0.000)**	**7.053.441**
Sector		
Materials	-1.778 (0.553)	2.995
Industries	6.167** (0.040)	2.995
Consumer Discretionary	8.083*** (0.007)	2.995
Consumer Staples	-2.750 (0.359)	2.995
Health Care	1.003 (0.740)	3.019
Financials	-2.806 (0.349)	2.995
Information Technology	4.500 (0.133)	2.995
Communication services	-4.694 (0.117)	2.995
Utilities	-4.250 (0.156)	2.995
Real Estate	-5.528** (0.065)	2.995
Test Economic Conditions*Sector		
Recession*Materials	5.444 (0.416)	6.697
Recession*Industrials	21.167*** (0.002)	6.697
Recession*Consumer Discretionary	12.250* (0.067)	6.697
Recession*Consumer Staples	1.306 (0.845)	6.697
Recession*Health Care	-2.892 (0.666)	6.697
Recession*Financials	-3.194 (0.633)	6.697
Recession*Information Technology	0.833 (0.901)	6.697
Recession*Communication services	-4.194 (0.531)	6.697
Recession*Utilities	4.361 (0.515)	6.697
Recession*Real Estate	-4.361 (0.515)	6.697
Location dummy incl.	Yes	Yes
Observations	*N=494, n=11*	

P-value in parentheses. *** denote significance at the 1% level. To ensure the validity of the regression model, the model has been rerun without the sectors, without the interaction test and with a decade dummy instead of a year dummy. Moreover, due to the right skewed distribution as shown in figure 1 the regression model has also been rerun including only the years with high IPO activity in the data set (1970-1989). All regression models gave similar and significant results. Hence, the table above is believed to be robust.

The correlation from the regression results is 74.480 (p=0.000). This suggests that on average 74 more companies go public per year during an economic recession, than during periods of economic upswing. The regression results slightly differ per sector, but no extreme differences occur. The lowest coefficient is 68.952 and the highest coefficient is 82.563. This shows that more companies go public during economic recessions than during periods of economic upswing. Only the dummy and the industries, consumer discretionary and real estate sector give significant results whilst the other sectors' results are insignificant. Hence, H2c will not be accepted, though this last regression did offer some additional insights into the IPO activity across economic periods. It seems that for some sectors IPO activity is encouraged by recessions and these companies can thrive on the long-term. Thus, it can be more beneficial for firms to plan their IPO during worse economic periods even though on the short-term this seems more challenging.

Robustness checks

To check whether the results found in the previous sub-section are robust to the assumptions made, multiple robustness checks are run to ensure the validity of the models and the results.

First, some basic regressions are run with more control and dummy variables added. Moreover, for this study all regressions are run for two different company performance statistics as a robustness check. Additionally, the regressions have been rerun by either cutting out one control variable, eg. company public years or by changing the measurement of the control variable, e.g., using the quick ratio for company liquidity instead of the current ratio. Overall, all robustness checks have led to some minor changes in the outcomes, although no changes in hypothesis evaluation are necessary. All regressions were also rerun using the *depth of the*

recession instead of the *IPO condition* dummy as the independent variable. This approach had been conducted in a similar manner in the research design by Schoar & Zuo (2017). The *depth of the recession* was measured as the number of months a recession lasted. All the results are robust despite the change in measurement of the independent variable.

In the data set there is a spike in IPO activity in the year 1970, which had a recessionary economic environment. To ensure the results are not biased by this spike, all regressions have been rerun on a data set which excludes all companies that have gone public in 1970. Due to this exclusion the observations and number of companies decreased significantly, affecting the results and significance levels. While most correlation coefficients have slightly decreased after excluding the 1970 companies, all regressions still gave similar and significant results. Thus, all results are shown to be robust.

V. Discussion

This thesis contributes to recent works in the behavioral finance and organizational research fields. While previous research has investigated the imprinting effects of CEOs on company performance, organizational and financial structures and the short-term stock performance effects of IPOs during recessions. This thesis has introduced a new view to current research and has explored the imprinting effects during IPOs on companies and the results on company performance. This thesis suggests that companies that successfully go public during recessions perform better in the long-term compared to similar companies that go public during non-recessionary periods. This effect differs across sectors, yet most companies that are active in sectors that are sensitive to recessions, will benefit from going public during recessions.

Theoretical and practical implications

This research extends on existing knowledge by investigating the imprinting effects of the economic environment on organizations. This is opposed to current research in the behavioral finance field which focuses on the imprinting effects on individuals, eg. CEOs. This research expands on the current field by not focusing on an individual-level study but on an organizational-level study, thereby expanding the research scope. Additionally, current research in the organizational field has researched whether companies can be imprinted by the economic environment. Yet, they have not researched what the long-term effects of imprinting, during an IPO phase, are on the organization's performance. By investigating the company performance of companies that are imprinted by the economic environment, this thesis study contributes to the existing knowledge within the research field.

Apart from these academic implications, this thesis can inform companies' boards. Based on the results of this thesis, a company board can time their IPO during a recession or decide to continue with their IPO plans even if a recession occurs. The results from this thesis show that

companies that get imprinted during periods of economic recessions can attain a sustainable competitive advantage. Hence, during recessions companies can decide to open up to the external environment. By adapting to this recessionary environment, the business can grow and attain a sustainable competitive advantage that will improve future company performance.

Research limitations

The findings from this research are robust to changes in the control variables and the exclusion of outliers. Moreover, they are robust to the depth of a recession. The findings from this thesis, however, have also been constrained by some research limitations. First, this thesis study has implied that one of the causes of better company performance is a sector's or a company's sensitivity to recessions. Therefore, the recession sensitivity is an important assumption upon which this thesis study is built. Yet, in the current models, only a sector's sensitivity, that is based on previous research, is used. For future research it would be recommended to add company specific control variables for a company's recession sensitivity. Moreover, this thesis considered the date of the IPO but not the size of the IPO. It is possible that smaller-sized IPOs take place during recessions. This could be a possible explanation for this thesis' lower ROA than ROE findings. Moreover, this research is based on a dataset which only includes companies from the United States. The findings may lack external validity, because other countries have different economic policies during recessions. Companies are affected by the economic policies during their IPO phase, hence different policies could lead to inconsistent imprinting effects. However, companies that go public during recessions, attain a sustainable competitive advantage. This advantage is assumed to lead to improved company performance in other geographical areas as well.

Future research

This thesis has set a foundation for future research. The current research could be expanded with a larger time frame or by including other geographical regions. Moreover, the economic

environment at the foundation of a company could have similar imprinting effects on future company performance, similar to the date of birth of a CEO (Malmendier & Nagel, 2009). Previous research has subsequently shown that a company's capital structure is very dependent on a CEOs early life experience. Similarly, a company's capital structure might also be influenced by the economic environment at IPO. For example, companies that go public during recessions might rely less on external financing. These effects may reinforce each other as a CEO who entered the market during a recession might be more likely to decide to go public during a recession. This thesis study affects policy makers as current IPO policies can have long-term effects on companies. Therefore, further research demonstrating how companies are affected by these policies is required. Lastly, this thesis proves that long-term company performance is positively correlated with recessionary IPO conditions. In section II, it is described that the short-run stock performance is worse for recession IPO stocks. The correlation might be opposite for the long-run stock performance due to the improved company performance.

VI. Conclusion

The objective of this thesis study was to extend on previous research by investigating the effects of the economic conditions, recession versus non-recession, at a company's IPO on its long-term performance and how these differ per sector. The results from this study show that companies are imprinted by the economic environment during their IPO. These imprinting effects positively influence long-term company performance. Hence, this thesis proves that there is a significant difference between the performance of companies that had their IPOs during economic recessions versus companies that had their IPOs during periods of economic upswing. In general, companies that have gone public during recessions outperform firms that have gone public during periods of economic upswing in the long-term, hence hypothesis 1 has been accepted. In future periods of economic recession firms that have gone public during recessions outperform firms that have gone public during better economic periods even more, thus hypothesis 1.a has been accepted. These imprinting effects significantly differ across sectors, which can be partially explained by a sector's sensitivity to recessions, supporting hypotheses 2, 2.a, 2.b. Hypothesis 2c has been rejected due to insignificant results. To further understand the correlation between the economic environment and IPO activity, future research is required.

The answer to this thesis's research question is that in general a company that goes public during a recession outperforms companies that go public in periods of economic upswing. These effects differ significantly across sectors and only companies that are active in recession-sensitive sectors will improve future company performance by going public during a recession. While companies that are active in recession-insensitive sectors will worsen future company performance by going public during a recession.

The results from this study are consistent with existing views in the behavioral finance and organizational research field. Not only individuals but also organizations can be imprinted during uncertain phases of their life cycle. Previous studies have also proven that company performance is influenced by the CEO's imprinted characteristics. This study has given a new perspective to this scientific consensus by investigating the imprinting effects of a company as a whole, rather than on the individual, on future company performance.

This thesis study proves that companies are imprinted during their IPO period. This imprinting positively affects future company performance if the IPO takes place during an economic recession. During a recession, companies can be affected by two different imprinting channels. On the one hand, improved company performance can be the result of recessionary economic policies affecting the IPO process. Here, companies are imprinted through the *direct imprinting channel* caused by the current economic environment. Another explanation is that during recessions companies are affected through the *indirect imprinting channel*. Through this channel, companies are required to become more adaptable to the external environment during a recession. This adaptability provides the company with a sustainable competitive advantage, improving future company performance. More research will be needed to further comprehend the significance of both imprinting channels on companies.

VII. Bibliography

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