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UNIVERSITY OF VAASA

Jaakko Löyttyniemi

Sustainability and Shareholder Value: Exploring ESG Scores and IPO Companies' Share Performance

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Author:	Jaakko Löyttyniemi	
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ABSTRACT:

In an initial public offering, a private company is listed on the stock exchange and its shares are publicly traded for the first time. The announcements and implementation of the initial public offerings often attract media attention. Moreover, there are widely known phenomena associated with the market performance of the shares of IPO companies.

Socially responsible investing means the investors' effort to consider responsible aspects while making investment decisions. Corporate social responsibility, in turn, describes the company's need to consider social, environmental, governance, and ethical aspects for its business to be responsible. Responsible investing and corporate social responsibility are key phenomena of the 21st century as the money invested based on sustainable aspects amounted to nearly seventeen trillion dollars in the year 2020. In addition, there are numerous studies on the impact of corporate social responsibility on the company's financial and market performance.

The study aims to examine the informativeness and practicality of the ESG scores provided by a rating agency for investing in newly public companies. This is done by comparing the so-called wealth relatives of the top 10% ESG score IPO companies to the wealth relatives of the bottom 10% ESG score IPO companies. In addition, this study investigates the possible positive effect of ESG ratings on wealth relatives of IPO companies. The data consists of 201 IPO companies that have gone public between 2010 and 2018 and that have Refinitiv (Thomson Reuters) Eikon's ESG scores for 3 years after the initial public offering. The empirical results indicate that the first year and three yearly wealth relatives of top 10% ESG score IPO companies are significantly higher than those of bottom 10% ESG score IPO companies. However, the study does not find a relationship between first-year wealth relatives and ESG scores of IPO companies nor between the first three annual wealth relatives and ESG scores of companies. Therefore, the findings suggest that in the creation of shareholder value, ESG scores mainly affect the market-adjusted returns of extremes of the rating scale.

KEY WORDS: initial public offering, IPO, corporate social responsibility, socially responsible investing, ESG

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1 Introduction

In an initial public offering, a private company is listed on the stock exchange and its shares are publicly traded for the first time. The announcements and implementation of the initial public offerings often attract media attention (Espinasse, 2014, pp. 2-3). In terms of research, initial public offerings are associated with interesting phenomena such as short-term good performance of IPO shares and long-term underperformance after the initial public offering which have been noted, for example, in studies by Ibbotson and Jaffe (1975), Rock (1986), Tinic (1988), Shiller (1990), Ritter (1991), Loughran and Ritter (2004), Lowry et al. (2010) and Ritter (2023).

Responsible investing and corporate social responsibility are key phenomena of the 21st century as the amount of money invested based on sustainable aspects has increased more than twentyfold since 1995 (US SIF, 2020). The ESG rating agencies provide information to investors about the responsibility of companies' operations, which motivates companies to act sustainably so that investors do not avoid investing in them (Dorflleitner et al., 2015). The studies by, for example, Cheng et al. (2014), Kölbel et al. (2017), and Verheyden et al. (2016) find that good corporate social responsibility is an advantage for the company's market returns.

In addition, the relationship between corporate social responsibility and the IPO companies' financial and market performance has been examined. IPOs have been found to be less underpriced in countries with good ESG government ratings (Baker et al. 2021), and the IPO shares have lower idiosyncratic risk if they have an ESG disclosure while going public (Reber et al., 2022). Moreover, companies with high ESG ratings perform better in the long term and are less likely to be delisted from the stock exchange (Fu et al., 2023).

1.1 Purpose of the study

The study aims to examine the informativeness and practicality of the ESG scores provided by a rating agency for investing in newly public companies. An increasing number of companies emphasize responsible aspects in their communication. However, for example, the study by Gold and Heikkurinen (2018) finds that emphasizing the sustainability aspects of companies often does not lead to significant actions in terms of sustainability in the company's business. Similarly, the work by Gray (2010) criticizes the lack of standards for what companies can mean by the term 'sustainability'. External actors are needed to compare companies' social responsibilities with each other. On the other hand, compared to for example the agencies who measure the credit ratings of the companies, there is no corresponding consensus among the sustainability rating agencies due to for example different amounts of metrics or different emphasis on measuring the dimensions of ESG.

In an initial public offering, the most important aspect is considered to be raising capital, for example for investments. Another possible motivation for an initial public offering is that the owners try to sell their holdings, for example, for retirement. An increase in the company's market value in the coming years makes the company's stock more likely to be the subject of analysis, which increases the company's visibility. Since shares may be offered to insiders at a price lower than the market price in connection with the offering, it is in the personal interest of these insiders that the company's share price increases in the secondary market. The study by Ibbotson and Jaffe (1975) finds that IPO shares have generally positive returns in the first year period from which it could be concluded that the secondary market performance of the initial public offering shares works by the interests of the insiders. Because an IPO often involves a so-called lock-up period, during which insiders cannot sell their holdings, the market value should have increased even after the end of the lock-up period (Espinasse, 2014: 215-216). By anomaly, the longer-term market performance of IPO shares is weak (Ritter, 1991). This thesis compares the usefulness of ESG information in these two situations.

According to the study by Reber et al. (2022), increased information regarding the initial public company's consideration of ESG dimensions in business reduces the information mismatch between investors and the company. Moreover, according to the study by Fu et al. (2023), the IPO companies that disclose their ESG information soon after going public are less likely to be delisted and their long-term returns are better compared to the companies that are not as open about their ESG scores. Moreover, the study finds that higher ESG scores reduce the risk of being delisted. Since after the IPO these companies' shares perform better the faster investors get information about their ESG issues, this thesis examines the importance of the quality of the information that investors receive in the development of the market value of IPO companies.

1.2 Hypotheses of the study

Since newly public companies need to get a sufficient number of institutional investors and because according to for example a study by Hong and Kacperczyk (2009) companies, whose business is unethical get fewer institutional investors and analyst coverage, it is assumed that the steady increase in the price of the stock, which the listed company aims for image reasons is more uncertain. Conversely, companies whose ESG aspects are taken care of can improve investors' confidence in the company's ability to manage in the future as sustainability becomes more and more important. On the other hand, a study by Chatterji et al. (2009) finds that rating companies' ESG estimates are more informative in extreme cases than, for example, comparing two companies with average ESG performance. At least at this stage, the ESG data offered by external rating companies is more informative for the investor in terms of whether the target company is exceptionally sustainable or unsustainable. Because ESG research is constantly progressing (Reber et al., 2021), and because investing based on ESG factors has become increasingly popular over time, this thesis also examines the potential linear relationship between ESG scores and market-adjusted returns.

To obtain a more comprehensive analysis of the relationship between sustainability and shareholder return, the thesis includes two statistical methods. First, a series of t-tests are conducted to examine whether the market-adjusted returns of the top 10% ESG score IPO shares are significantly greater than the market-adjusted returns of the bottom 10% ESG score IPO shares. Secondly, the relationship between the ESG score and market-adjusted returns of the entire sample is studied using regressions. This leads to the following two hypotheses:

H_1 : IPO shares with top 10% ESG scores have significantly higher market-adjusted returns than IPO shares with bottom 10% ESG scores in both short-term and long-term.

H_2 : ESG scores have a significant positive effect on the market-adjusted returns of IPO shares in both short-term and long term.

1.3 Structure of the study

The structure of the thesis after the introduction chapter is as follows. The second chapter discusses the reasons for companies to go public, the initial public offering process, and how the offering prices of IPOs are determined. The third chapter discusses the anomalies related to initial public offerings. The fourth chapter discusses the growing popularity of responsible investing and the effect of corporate social responsibility. In addition, the fourth chapter describes the earlier research related to the ESG and initial public offerings, which concludes the theoretical part of the thesis.

The theoretical part of the thesis is followed by an empirical part. The first half of the fifth chapter presents the data for the empirical studies and the second half describes the methodology to test the research hypotheses mentioned earlier. The sixth chapter examines the empirical results. The final chapter discusses the results, highlights some limitations of the study, and proposes future research possibilities.

2 Initial public offering

This chapter first discusses the motivations for companies to change from private companies to public companies. Then, the initial public offering process itself and what issues those involved have to take into account are described. The last section of this chapter discusses the valuation of IPO.

2.1 Reasons for companies to go public

According to Espinasse's (2014, p. 1) research, the initial public offering may be the most significant activity in terms of the company's growth during its life cycle. During the initial public offering, the company's current owners reduce their ownership or give up their ownership completely. The IPO also offers for the first time an opportunity for outsiders to buy the company's shares on the stock exchange. The initial public offering of a company provides investors with opportunities to buy and sell stocks of a company in the secondary market for the first time. Especially the original shareholders of a company, who already own the shares benefit from the increase in liquidity of their stocks. Moreover, according to the research, the initial public offerings are regularly underpriced to make sure that enough investors participate in the offering. This 'IPO discount' offers investors opportunities for quick returns as the value of the stocks increases in the secondary market. Although different actors benefit differently from initial public offerings, from the point of view of the company, they are intended to reduce the previous owners' ownership of the company and to increase equity capital, which can be used, for example, for investments or to reduce debt.

2.1.1 IPO and the Capital structure

From a financing perspective, an IPO is seen as an alternative activity to increase share capital for investments instead of taking on debt. The study by Shah and Thakor (1988)

shows that public companies make larger investments than private companies. Based on this, an initial public offering is useful for a company aiming for growth. Because when being listed on the stock market, the company's stock becomes more liquid, it is easier for investors to increase or decrease their ownership of the company when necessary. This, in turn, reduces the possibility of personal loss for the owners, so owners who have diversified their investments can demand that the company takes more risks. In addition, managers of public companies do not often have much ownership of the company, so they can take more risks such as increasing investments. According to the study by Shah and Thakor (1988), this is reflected in the lower project hurdle rate of public companies compared to private companies.

Some findings differ from those mentioned above. For example, the study conducted by Pagano, Panetta, and Zingales (1998) finds that in Italy, an initial public offering is used to balance the company's capital structure. There the company makes its biggest investments before the initial public offering, financing them by taking on debt, and the capital obtained through the IPO is used to pay off that debt. The discovery indicates that a company in Italy that has made large investments is forced to go public due to heavy debt. This claim is supported by the finding of the study that the number of investments by companies decreases after the initial public offering. Research by Aslan and Kumar (2011), on the other hand, shows that this phenomenon does not exist in the United Kingdom, where, according to their observations, the company's investments increase significantly after the company has gone public. Correspondingly, a company that goes private significantly reduces investments and reduces the volume of its business.

However, public companies have better opportunities to obtain debt with better credit terms which are due to the greater transparency of a public company than a private company (Pagano et al., 1998). In addition to the previously mentioned aspects, for this reason, for example in the USA, it is possible for a public company to increase its investments better than a private company (Shah & Thakor, 1988).

2.1.2 IPO and the Ownership structure

In an initial public offering, the company's ownership structure changes when its previously privately owned shares end up being publicly traded. This means that the previous owners of the company not only have a smaller ownership share, but also less control over the company. Due to this reduced control related to the initial public offering, according to a study by Aslan and Kumar (2011), family businesses go public less often than others. If the owners of a private company are ready to give up their ownership, for example, to retire, an initial public offering can be used in such an 'exit'. Private companies may also be managed by venture capitalists who have bought part of the company to run it. According to an article by Zingales (1995), an IPO can be implemented so that they get a good return on their investment. Research by Derrien (2005) suggests that especially in the 'hot' IPO market, i.e., in a period when newly listed companies outperform benchmark indexes on the stock exchange, initial public offerings are overpriced. Previous owners who relinquish ownership will then be able to get a better price than they should get according to the fundamentals.

Before the initial public offering, private owners hold the company's shares. Due to their large shareholding, these owners have also control and influence over the company's operations. When a company goes public, its shares are subject to public trading on the stock exchange. The number of owners increases and the share of individual owners in the company decreases, and also those who do not actively participate in the company's business receive the company's returns through the shares they own in the form of dividends. In this case, it is possible that because of many small passive investors, the 'free rider' problem of this company will become significant. According to research by Mello and Parson (1998), the company must have sufficiently large individual owners even after the initial public offering. Their study claims that it would be optimal to organize the IPO in such a way that a certain part of the shares is reserved for small investors and a large investor who wants to actively participate in the company's operations after the IPO is sought. A larger share of the company is then sold to this larger investor as a block. Since finding such an investor is crucial for the company's

future, research suggests that large investors could be attracted by selling these shares at a discount if necessary. After this, the shares intended for the previous phase could be sold to small investors individually without a discount. The findings of the research by Mello and Parson show that this kind of attracting larger buyers despite the discount is profitable for the company because the company's future looks better to investors, which in turn improves the company's market value.

2.1.3 Other reasons for going public

In addition to the two larger purposes, acquiring capital and changing the ownership structure, initial public offerings can be implemented based on other reasons. For instance, initial public offerings, especially of large companies, gather a lot of media attention. Espinasse's (2014, pp. 2-3) study suggests that although a company is unlikely to be listed solely in the hope of visibility, the increased status can positively affect the market value of the company.

According to Espinasse's (2014, pp. 3-4) study, companies may have regional reasons for implementing initial public offerings. A large and global company can be listed on a foreign stock exchange due to distant investors who are interested in investing in its business so that investors can trade the company's shares under their time zone. Similarly, it may also be possible that the company has moved a lot of its premises to another country and therefore wants to be listed on the stock exchange in that country. A successful and grown company may also seek new investors by raising its status by de-listing on the stock exchange where it is at the moment and re-listing on a better-known or larger stock exchange. Espinasse's study mentions, for example, a Taiwanese food manufacturer called Want Want, which was delisted from the Singapore stock exchange in 2007 and listed on the Hong Kong stock exchange a year later. It is also possible for the company to get a higher valuation on the stock exchange, where it already has good benchmark companies (Pörssisäätiö, 2016).

2.1.4 Disadvantages and duties associated with going public

Espinasse's (2014, pp. 4-5) study reminds that, in addition to advantages, initial public offerings also have disadvantages and duties associated with them. The most obvious drawback of the initial public offering is that the process is expensive for the company to implement. Investment banks generally charge, for example, their travel expenses to the client company, so the company must take into account a large number of possible hidden costs to avoid exploitation (Espinasse, 2014, pp. 60-61). Moreover, a listed company has more obligations to inform investors about the development of its operations, which in turn causes costs for the company. The company must therefore ensure that resources are sufficient for the activities mentioned above. Since the purpose of the stock market listing is to increase the company's capital, The research by Shah and Thakor (1988) finds, that listing activity is negatively affected if the cost level of the initial public offering processes increases. A listed company also becomes exposed to the threat of being taken over when the company's shares are publicly available. Before the listing, the company should take into account the reduced control of the company by the original shareholders after the listing.

2.2 Initial Public Offering Process

The following subsections describe the changes in companies preparing for the IPO process, required actions during the actual initial public offering, and what happens in companies after the IPO. The final subsection concludes what kind of factors contribute to the success of a stock exchange listing. In addition, it examines whether a company can influence the success of its initial public offering by timing.

2.2.1 Before the IPO

The company cannot go public without meeting the requirements of the exchange they are planning on listing to. As the company sizes vary around the world these

requirements differ between exchanges. According to Espinasse's (2014, pp. 5-7) study, the most common requirements are related to the age of the company, the size of the business measured usually with turnover and profit, or a market capitalization of a certain size. It is also common for regulators to require a company to adapt its accounting to meet the general standards of the respective exchange. Espinasse's study (2014, pp. 12-13) explains the reason for the required size of the company planning on the listing is that its shares remain liquid on the stock exchange. Companies larger in size generally have a larger trading volume, which benefits brokers in the form of commissions. Smaller companies, on the other hand, are not of interest to analysts and are not as liquid.

Because the investment bank buys the company's shares and sells them on the secondary market, the company needs to be attractive to the investment bank. Espinasse's study (2014, pp. 7-8) describes the companies that are of interest to investment banks are market leaders in a sector that is growing rapidly. A company can also be of interest to investment banks if it operates in a field where there is not much competition yet. In turn, investment banks avoid companies whose future prospects are not clear, because it makes it difficult for them to determine the offering price. According to Espinasse's (2014, p. 13) study, the most reputable investment banks have generally required companies to have a minimum market capitalization of 250 to 400 million dollars, to collaborate with them in the initial public offering. Another way of measuring the size is the size of a potential IPO, which these investment banks generally require to be a minimum of 50 to 100 million dollars.

If the company meets the criteria of several exchanges, it must choose which exchanges it will be listed on. Espinasse's (2014, pp. 13-21) study reminds that some exchanges may for example oblige the companies to locate within the same country as the stock exchange, and moving the company's premises or headquarters to another country may be unprofitable. However, with many companies operating globally, this is not common. For practical reasons, the difference between the time zone of the company's premises and the time zone of the stock exchange should not be large. For a company, choosing a

prestigious stock exchange can also be a matter of image as a liquid and transparent stock market is more attractive to investors. On the other hand, the costs of being listed on a prestigious stock exchange are higher. Occasionally, exceptionally large international companies may be listed on several stock exchanges. However, this increases the factors to be taken into account in the company due to the differences in requirements between different stock exchanges and the legal aspects of the home countries of the respective stock exchanges.

According to Espinasse's (2014, pp. 22-23) study, when a company is planning an initial public offering, it is advisable to form a corporate management department that serves this purpose. This can be thought of as a precursor to the Investor Relations department needed in the future. According to the work of Espinasse (2014, pp. 22-23), including the company's top executives in this department is not optimal for the task because, for example, the chief executive officer and the chief financial officer have other tasks that cannot be left undone during the IPO process. Good qualities for those chosen in this department include, for example, experience working in the IR department, investment banking background, and legal expertise.

Espinasse's (2014, pp. 63-66) study discusses that although in a simplified way, the IPO process mostly involves the investment bank and the client company, other external actors are often also needed in the process. Especially in the US, due to legislation, both the company planning an initial public offering and the investment bank need to have legal advisory. Thus, it can be ensured that both parties work correctly, and abuse suspicions are reduced. A legal advisory may also be needed from an expert in local legislation if the IPO is implemented abroad. Although the law firm's services cause costs, they are insignificant compared to the possible sanctions that can be obtained by breaking the law. Since, as mentioned above, the stock exchanges require that the accounting of companies meet certain standards, it is worth using resources for reputable auditors for the sake of the credibility and transparency of the company.

2.2.2 IPO Process

When the parties involved in the initial public offering are clear and the requirements set by regulators or the exchange are met, the arrangements for the actual process can be initiated. The duration of the whole process itself from this moment to the actual listing naturally varies, and according to the research by Espinasse (2014, pp. 77-78), the length of the process is significantly affected by how experienced the actors involved in the process are in terms of stock market listings. Another aspect that shortens the duration of the process is the company's available resources for the initial public offering. If the company has a lot of experienced actors with previous offerings, who can focus on the process itself, the required time is shorter. According to the research, the reserved time for this part of the process is between six and nine months.

Espinasse (2014, pp. 78-79) divides the initial public offering process into activities related to preparations, due diligence, and marketing of the listing itself for investors. Of these, he mentions due diligence work as the most time-consuming. This also demands a lot of resources from the company, when different advisors go through the company's financials. This task aims to get a prospectus compiled so that it can be presented to regulators or the stock exchange. In the US, the prospectus is sent to the Securities and Exchange Commission if the company is planning on listing on the New York Stock Exchange or Nasdaq. When the preliminary prospectus has been reviewed, usually six to eight weeks after it is sent, and the regulator has either approved the process as it is or with changes. Regulators may set, for example, a minimum amount with which investors can invest in an initial public offering. These measures, for example, reduce the benefit of speculative investors from the IPO discount.

For the shares to be sold in the offering, investors who are willing to participate must be found. A tactic that, according to Espinasse (2014, pp. 80-85), the listed company and the investment bank use is to deliberately keep this phase short. The principle of operation here is to act in the same way as grocery store offers that are valid 'only for a limited time'. In addition to creating a sense of urgency for investors, the rapid marketing

phase aims to avoid, for example, changes in the market environment that might negatively affect the success of the IPO. During the marketing phase, analysts not included in the initial public offering process may also offer investors their estimate of the company's value. However, publishing this pre-deal research is not allowed in the US. It is possible to use these estimates besides the estimates of the underwriter when the company determines the price range for the share in the initial public offering. However, in Europe, for example, it is common to form a share price based on feedback from potential investors without having previously defined a price range.

When the price has settled and investors have agreed to participate in the IPO, this is followed by a short period before the shares start trading on the stock exchange. During this phase, the verification of transactions will be arranged. In the USA and the UK, this takes only a short time and in practice trading on the secondary market starts immediately after the shares are allocated (Espinasse, 2014, p. 81).

2.2.3 After the IPO

Some parties engage in the process after the shares have started trading on the stock exchange. Espinasse (2014, p. 209) mentions that after the initial public offering, there is a risk that the market price will not remain stable on the stock exchange. For example, this can be caused by the large number of speculative investors who buy and sell shares in the hope of a quick return. To be able to stabilize large price changes, a lot of money is needed to buy shares in large enough quantities. Due to this fact, banks generally function as agents.

According to Espinasse (2014, pp. 215-216), there are requirements and restrictions for those involved in the process after the initial public offering. The investment banks that participated in the IPO must wait for a 40-day research blackout period before they can give their clients estimates on whether the shares are overpriced or underpriced. It is worth noting that later in the future, from the point of view of the company, that is

favorable for analysts to give buy and sell recommendations for the company's shares, in which case investors' interest is maintained. Some investors who obtain larger amounts of shares in the initial public offering and also many who previously owned the company's shares are obliged to wait for the lock-up period. During this period, such owners may not sell their shares. The length of this period usually varies from six to twelve months. At the same time, the company may not organize new share issues during this period. When the end of this lock-up period approaches, the share price often decreases as the market expects the sale of large quantities.

As mentioned at the beginning of the chapter, a company listed on the stock exchange has to take several things into account to remain there. Espinasse (2014, pp. 216-217) emphasizes increased reporting that is required from a company listed on the stock exchange. For example, a company listed in the United States must submit an annual report six months after the end of the financial year which means, in practice, that it is obliged to submit either a 20-F form or a 10-K form to the Exchange Commission and the stock exchange, depending on whether the company is international or national. In the United States, the company must also submit interim reports on its business both half-yearly and quarterly.

According to Espinasse (2014, p. 217), after going public, the company's obligations to produce information are not limited to information for the regulator and the stock exchange. The newly public company must also provide information to investors. Since the company's shares are actively traded, the company must inform investors about both good and bad aspects of its business that cause future prospects for the sake of reliability and transparency. The study by Espinasse (2014, p. 217) claims that at this stage of the company's life cycle, it becomes timely to establish a separate Investor Relations department. He presents the working group that was previously in charge of the initial public offering process as natural candidates to manage this area. These people should have been visible figures in the company's stage of marketing the upcoming initial public offering so that they are familiar with current investors. As the name suggests, the

Investor Relations department is responsible for communication with investors and the official channel for investors to communicate with the company. Espinasse (2014, p. 217) suggests that the company can also possibly take on an external consultancy to support the new Investors Relations department.

2.2.4 Characteristics of a successful IPO

Every company which is about to conduct an initial public offering strives to be successful in this perhaps one of the most essential events during its lifetime. According to Espinasse (2014, pp. 227-230), especially the most successful IPOs receive a lot of positive publicity which is beneficial for a growing company.

Espinasse (2014, p. 228) emphasizes the importance of the company's 'story'. By this, he refers to the previously mentioned position as the only operator or market leader in a fast-growing industry which makes a company an appealing case for investment. This does not exclude the possibility that an average company could also succeed. However, with a good 'story' of a company, not only investors but also good investment banks are more likely to join the process. In addition to this, especially competent and inspiring company management offers the opportunity to stand out in favor of investors in the marketing phase of the initial public offering process. According to Espinasse, (2014, p. 228) such interesting personalities keep the interest in the company, especially after the initial public offering.

Even if a company's listing is aimed at raising share capital for investments, one should nevertheless understand the possible additional benefit that companies with large market capitalization receive in the form of visibility on the stock exchange. Espinasse (2014, p. 228) stresses the benefit to the company, the more analysts examine it. Extensive analysis of the company by numerous different analysts increases the company's reliability in the eyes of investors and raises the company's profile. Correspondingly, companies with a small market capitalization may succeed in the most

important goal of listing to get more equity capital but do not often attract investors in the secondary market due to low attention. Research by Aslan and Kumar (2011) supports Espinasse's view on the importance of the size of the company and its market capitalization because according to their research, companies with a large market-to-book value are likely to go public.

Even if the company's 'story' and characteristics are good, bad market conditions may weaken the IPO's chances of success (Espinasse, 2014, p. 229). Ibbotson's and Jaffe's (1975) study examines how different market situations affect the success of an initial public offering. The findings of their study suggest that the market can be divided into 'hot' and 'cold' IPO markets, based on what kind of market-adjusted returns are obtained from the initial public offerings after the first month on the stock exchange. When the shares of newly public companies regularly generate better earnings than the benchmark index, the study by Ibbotson and Jaffe suggests that the IPO market is 'hot'. Correspondingly, in 'cold' IPO markets, the benchmark index outperforms shares of listed companies. 'Hot' IPO market increases investment activity as speculative investors seek to benefit from larger increases in the value of the share prices in the secondary market. From the point of view of the company and the investment bank planning an initial public offering, higher investment activity in the 'hot' IPO market enables a higher offering price of the company's stock to be set. Since market situations can change suddenly, it is safer for those responsible for the initial public offering process to keep the marketing phase short for this reason as well (Espinasse, 2014, p. 80). In addition, Espinasse (2014, p. 82) finds that the success of the initial public offering is reduced if there is another company's initial public offering on the same day. The offering date should also not be in the summer or at the end of the year, because potential investors may then have other interests.

Because timing is one of the key characteristics of a successful IPO, it would be in the company's interest to know how to anticipate a 'hot' IPO market. Ibbotson's and Jaffe's (1975) study claims that consecutive 'hot' or 'cold' IPO markets do not follow a random

walk but are rather autocorrelated. Based on this finding, it would theoretically be possible for the company to predict the future 'hot' or 'cold' IPO market based on the current market situation. In addition, a study by Pástor and Veronesi (2005) includes a formula to calculate the optimal timing for a company to go public based on the finding that more initial public offerings occur after an increase in market conditions. Correspondingly, as the market condition starts to decrease, companies implement fewer IPOs. In the study, this phenomenon is called an 'IPO wave'. One 'IPO wave' begins with an increase in market returns which causes an increase in the number of initial public offerings. The 'IPO wave' ends when the market returns start to decline which in turn causes a decrease in the number of initial public offerings. The study also supports the findings of Ibbotson's and Jaffe's (1975) research that the IPO market does not move according to the random walk.

In theory, changes in the IPO market situation have been verified to be moderately predictable, and it is in the interest of the participants of the initial public offering process to set the offering price higher. In practice, the pricing of a listed share rarely corresponds to the market price. Derrien's (2005) study estimated that 803 IPOs in the US in the years 1999 and 2000 alone could have obtained over 50% more money by setting the offering price higher although the IPO market in question was particularly hot. Derrien's research hypothesizes returns on the hot IPO market are not due to inaccurate pricing but to noise trading. In a market upswing, bullish traders are ready to buy a stock at a higher price than its fundamental value, because they believe that the price will rise further. Derrien's research hypothesis is supported by findings that show that investor activity depends on prevailing market conditions. Moreover, the high trading activity after the initial public offering is associated with lower returns in the future, indicating that the price of shares has risen too high on the stock exchange. The latter finding supports the claim in Ibbotson's and Jaffe's (1975) research that the share price of a company listed on a 'cold' IPO market will fall less in the future than the share price of a company listed on a 'hot' IPO market.

2.3 Valuation and pricing of initial public offerings

This part of chapter two describes the different valuation methods underwriters can use to determine the offering price. In determining the share price, the valuation phase forms the first half, followed by the pricing phase (Roosenboom, 2012).

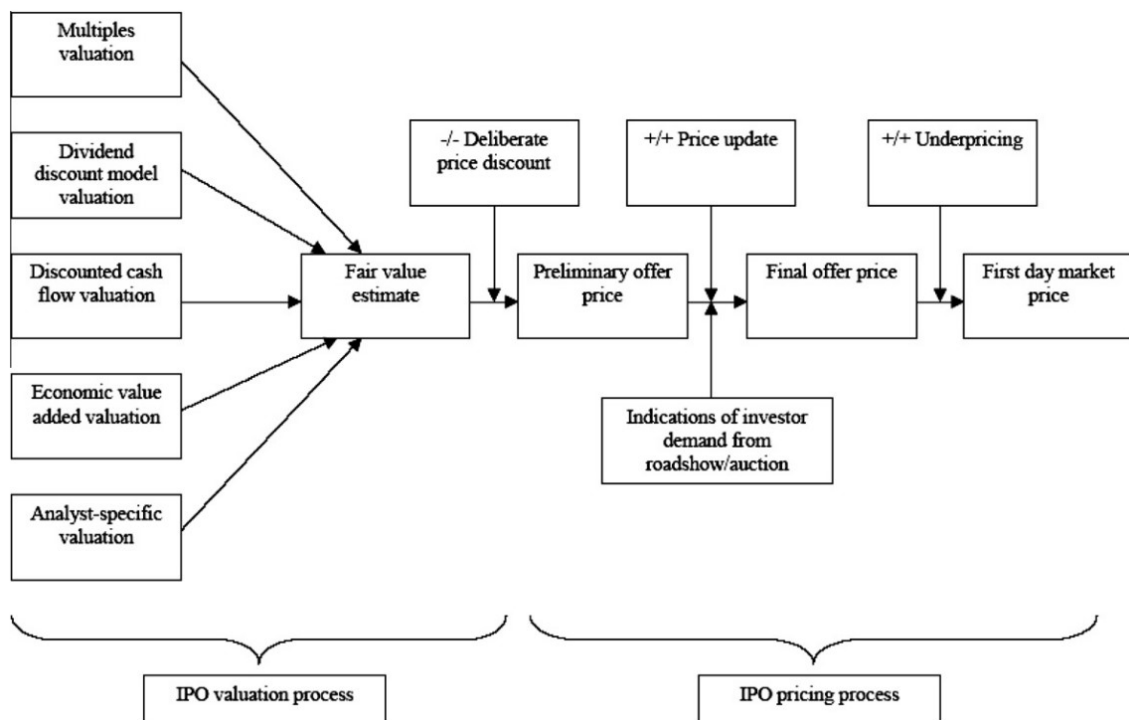


Figure 1. IPO valuation and pricing process (Roosenboom, 2012).

The figure 1 shows how the IPO price can be determined according to the study by Roosenboom (2012). As a whole, the process is divided into a valuation phase and a pricing phase. In the valuation phase, usually the investment bank acting as an underwriter uses various valuation methods in use to determine the fair price of the company's share. In addition to the multiples valuation, dividend discount model (DDM) valuation, and discounted cash flow (DCF) valuation mentioned below, economic value-added valuation can be used. In general, the formula for economic added valuation is

the same as research by Biddle et al. (1997) uses to calculate residual income (RI). The formula is as follows:

$$RI = NOPAT - (WACC * capital) \quad (1)$$

where *NOPAT* is the net operating profit, *WACC* is the weighted average cost of capital, and *capital* is the capital invested. Besides these methods, analysts may use some different valuation methods to determine the fair share value.

When the fair value is estimated using the valuation methods, according to Roosenboom (2012), underwriters generally make changes, after which a preliminary offer price is created. Usually, at this stage, the price of the share is lowered with the so-called IPO discount. As mentioned earlier, according to Espinasse's (2014: 80-81) work, issuing companies in Europe do not necessarily reveal the underwriter's estimates of the share's value in the marketing phase, but the share pricing starts based on investor feedback. The offering price is then set, and the market price of the share is determined after the listing when the share starts trading on the secondary market.

According to the study by Roosenboom (2012), underwriters use three common equity valuation methods: multiples valuation, dividend discount model (DDM), and discounted cash flow (DCF) valuation. The findings of the research suggest that these methods do not differ greatly in accuracy. The following subsections describe the valuation methods.

2.3.1 Multiples valuation

The study by Roosenboom (2012) finds that the valuation using different multiples was the most common valuation method used by underwriters in IPOs going public on the French stock exchange. The method aims to set an estimate of the share's market price by comparing it to the shares of competing companies that have already gone public. The use of valuation requires that the industry rivals are sufficiently similar to the issuing

company. For example, according to research by Kim & Ritter (1999), especially young companies' ratios used in multiple ratios vary which reduces the accuracy of the valuation.

According to the study by Roosenboom (2012), the price-to-earnings (P/E) ratio is the most common multiple used in the valuation of French IPOs. The price-to-earnings ratio can be measured by dividing the price of the company's share by the company's earnings per share. When the average of different P/E numbers is measured, based on the result, the value of the issuing company's share can be calculated by multiplying the industry P/E number by the company's earnings per share. A work by Larrabee et al. (2012: 390-391) determines the average P/E as follows:

$$\text{Average } P/E = \frac{1}{n} \sum_{i=1}^n P/E_i \quad (2)$$

where n is the number of comparable publicly traded companies and P/E_i is the price to earnings ratio of a company i . The work also provides another way to determine P/E using the harmonic mean. According to the study, the harmonic mean can be used in such a situation if a comparable company has, for example, an exceptionally high P/E figure due to low earnings per share (EPS). In this case, this single high P/E can make the industry multiple too high. The harmonic mean P/E is measured as the inverse of the average E/P ratio. The E/P ratio is in turn the inverse of the P/E ratio. The formula is as follows:

$$\text{Harmonic mean } P/E = \frac{1}{\frac{1}{n} \sum_{i=1}^n E/P_i} \quad (3)$$

where E/P_i is the inverse of the price to earnings ratio of a company i .

Several different ratios can be used in valuation. According to the study by Roosenboom (2012) the other widely used multiples in valuations are for example the price-to-cash-flow (P/CF) ratio, price-to-sales (P/S) ratio, and price-to-book (P/B) ratio.

2.3.2 Discounted cash flow (DCF) valuation

The company's discounted cash flow valuation is based on the idea that the value of the company is determined according to the cash flow it produces for the owners during its lifetime. In general, cash flow refers to free cash flow, where the company's generated cash flows are deducted according to the work by Larrabee et al. (2012, p. 84) for all capital expenditures. In the valuation, future cash flows are discounted to the present. In the work by Larrabee et al. (2012, pp. 105-106), the DCF formula is as follows:

$$Value = \sum_{n=1}^{\infty} \frac{CF_n}{(1+i)^n} \quad (4)$$

where CF_n is the cash flow in the time period n and i is the discount rate. The discount rate used is usually the weighted average cost of capital. Using the formula, it becomes difficult to estimate cash flows in the distant future. As an alternative to counting to infinity, terminal value (TV) can be used. According to the work of Larrabee et al. (2012, p. 106), in discounted cash flow (DCF) the estimated future cash flows of 5 to 10 years are usually used, from which point the cash flows are measured with the terminal value. The formula for the terminal value is as follows:

$$TV = \frac{CF_1}{i-g} \quad (5)$$

where CF_1 is the cash flow for the next period, i is the discount rate, and g stands for the percentage by which the company's cash flow grows constantly. With the terminal value, the DCF formula can be measured as:

$$Value = \sum_{n=1}^t \frac{CF_n}{(1+i)^n} + \frac{TV_t}{(1+i)^t} \quad (6)$$

where CF_n is the cash flow in time period n from one to t , i is the discount rate and TV_t is the terminal value in time t .

2.3.3 Dividend discount model (DDM) valuation

The third commonly used valuation method for French IPOs is the dividend discount model (Roosenboom, 2012). The dividend discount model measures the value of a company by how much dividend it can distribute to its owners. The work by Larrabee et al. (2012, pp. 270-271) suggests the advantage of the model is its simplicity. Nevertheless, according to the work, it can give incorrect results if there are changes in the companies' general dividend policy. According to the dividend discount model, the formula for the current value of a share can be measured as:

$$P_0 = \frac{DIV_1}{k_E - g} \quad (7)$$

where P_0 is the current price of the share, DIV_1 equals the expected dividend after the period 1, k_E equals the cost of equity, and the g equals the constant growth rate of dividends.

According to the work by Larrabee et al. (2012, p. 271), the dividend discount model requires certain conditions for its use to be appropriate. As can be seen from the denominator of the formula, the formula only works if the company's cost of equity is

greater than the company's constant growth rate. If it is the opposite, the formula gives a negative value to the share which would make the model useless for determining the stock of that company. The dividend discount model cannot be used, for example, when the company is in a fast-growing phase. Moreover, this valuation assumes a constant return on the reinvested capital.

3 IPO Anomalies

This chapter describes common market anomalies related to initial public offerings and how they fit in with the efficient market hypothesis. In addition, this chapter presents explanations for anomalies offered by previous studies.

3.1 Efficient Market Hypothesis

Fama's (1970) research states that rationally functioning investors who have all the information available use new information quickly in their investment decisions, which drives share prices to a state where their value fully reflects the value of the company. According to Fama (1965), this is caused by competition, when rational investors try to take advantage of possible mispricing of stocks, which would eventually lead to the disappearance of this mispricing. The hypothesis of market efficiency makes several assumptions that do not apply much in practice. For example, it does not take into account transaction costs, taxes, or the fact that obtaining information may incur costs. It is also based on the assumption that there is perfect competition in the market and that investors are rational. Fama's (1970) hypothesis claims that even if such conditions do not exist, it does not rule out the existence of an efficient market. According to his work, although costs arise from transactions, if investors make decisions based on available information, the market can function efficiently.

3.1.1 Forms of market efficiency

According to Fama's (1970) research, this kind of market efficiency can be assessed as the weak, semi-strong, and strong form of capital market efficiency. Efficient markets can be divided into one of these three forms based on their efficiency. These forms are not mutually exclusive which means that the requirements of the weak form apply in the

semi-strong form and that the conditions of the semi-strong form apply in turn in the strong form.

The weak form of stock market efficiency requires that the information setting the prices of shares is conducted using historical prices and past information (Fama, 1970). Because the information on the market varies and cannot be predicted it is not possible to make abnormal returns in the long term using, for example, technical analysis.

In the semi-strong form of stock market efficiency, the market prices of shares react immediately to new publicly available information (Fama, 1970). In the semi-strong form of market efficiency, it is therefore not possible to obtain abnormal returns as rational investors are making investment decisions with simultaneous access to the information.

The strong form of stock market efficiency requires that market prices of shares are set based on both public and private information (Fama, 1970). In this case, information normally known only to the insiders of the company has been reflected in the share price and it is no investor can have an advantage over others.

3.1.2 Random walk

Since it is not possible to know in advance whether the future information is positive or negative, it would be impossible to predict the future returns of shares based on current information alone. In this case, the price changes of the shares on the stock exchange would take place according to a random walk. Profits, for example in the stock market, have been sought to be obtained using technical analysis, which aims to identify various regularly recurring trends and invest accordingly 'as history repeats itself'. If the price patterns of shares were formed according to the random walk according to Fama's (1965) research, it would be useless to use technical analysis when making an investment decision.

An alternative to technical analysis is fundamental analysis. Where technical analysis at its simplest takes into account nothing else about the company than the historical price pattern of its stock, fundamental analysis evaluates the company's potential to generate cash flows in the future. An investor using fundamental analysis can compare the current price of a share with its fundamental value and make investment decisions according to whether the market price of the share is higher or lower than its intrinsic value. Since it is impossible to accurately estimate the effect of positive or negative news on the stock price, and since investors may interpret the news differently, according to Fama (1965) the share price may then be incorrectly priced from time to time. However, according to Fama's hypothesis, rational investors notice a regular distortion in the share price and exploit this in the hope of profits. Since there are several actors in the stock market, there is little time to take advantage of this mispricing until the share price again matches its fundamental value. Fama's research draws its conclusion from this that efficient stock markets move reflecting the real value of the stock and according to a random walk.

3.1.3 Criticism of EMH

Since the conclusions of Fama's studies strongly questioned the use of both technical analysis and fundamental analysis, criticism of these arguments has arisen later. Malkiel's (2003) work emphasizes two historical events that are, according to some researchers who do not agree with Fama's (1970) efficient market hypothesis, indisputable examples of situations where investors have not been rational and thus the market has not functioned efficiently either. The first event Malkiel's study mentions is the great stock market crash in October 1987 whereupon stocks' market value decreased collectively and on average by a third. On the other hand, Malkiel's (2003) work explains that even such a large market reaction can be explained by new information related to the valuation. One reason for the change may be the rise in treasury bond interest rates that occurred shortly before the change. In addition, in the same month in the United States, it was planned to introduce the merger tax, which would increase the costs of mergers.

According to Malkiel's (2003) study, another similar case illustrating the irrationality of investors is the IT bubble of the late 1990s. During that period, the price of tech stocks rose significantly higher than what the company was worth. Naturally, this increase in value was followed by a collapse in the price of technology stocks later. On the other hand, since the valuation is based on estimates of the industry's future and the company's growth opportunities, investors have been able to react rationally to new information. The problem, in that case, would not be the functioning of the market, but the overoptimism of the information. At that time, the internet was a new phenomenon and estimates of its growth potential varied widely. Malkiel's (2003) study reminds different analyses, which were based on unrealistic growth opportunities in retrospect, estimated share prices too high.

Moreover, the study by Lo and MacKinlay (1999) cannot, based on the findings, accept the hypothesis that stock price fluctuations would occur according to a random walk, as the findings of their study show a dependency between consecutive observations. This phenomenon is called price momentum. According to a study by Jegadeesh and Titman (1993), with such a strategy, where a long position is taken in shares that have performed well in the previous 6 months, for the next 6 months, in the years 1965 and 1986, an average return of 12 percent better than the benchmark index would have been achieved. As an explanation for why the findings do not support the hypothesis of a random walk of stock returns, their study presents that investors believe that the positive price pattern will continue. Investors, therefore, sell shares with negative returns and buy shares with good returns, and this overreaction causes the phenomenon. However, according to the findings of Odean's (1999) research, various transaction costs and other expenses that contribute to the volume of trading lead to the fact that in practice investors cannot take advantage of the price momentum of shares, even if it is theoretically detectable.

Similar market anomalies, which contradict the hypothesis of market efficiency, have been observed over the decades. The Momentum phenomenon studied by, among

others, the study by Jegadeesh and Titman (1993) has similarities to the findings of the study by De Bondt and Thaler (1985), according to which stocks that have performed very well in the short term tend to perform worse in the long term and vice versa. Both of these phenomena are explained by market overreaction, which indicates that investors do not act rationally.

Fama's (1998) later study responds to the criticism. According to his work, even efficient stock markets may irregularly overreact or underreact to new information in the short term. The study claims that, in terms of the hypothesis of efficient equity markets, it is essential that in the long term, no anomalies occur regularly. Thus, the equity market can function efficiently despite overreactions and underreactions in the market if these overreactions and underreactions can be shown to be random. The main claim of the research is that in the long term, such market anomalies will disappear. According to the study, the possible demonstrations of long-term recurring anomalies are due to research methods or specific source material, in which case the findings of these studies are not sufficient to disprove the efficient market hypothesis. However, the claim that rational investors make the anomaly disappear over time is not supported by, for example, the findings of a research by Jegadeesh and Titman (2011), according to which the momentum phenomenon, which has been known and studied for several decades, also occurs later.

3.2 Anomalies related to initial public offerings

Throughout history, it has been noticed that stock market listings have been accompanied by anomalies. Ritter's (1991) work highlights three key anomalies related to initial public offerings. Perhaps the most well-known anomaly is related to the constant underpricing of IPOs, which has led to abnormal and regular returns on the secondary market. Another key anomaly possibly connected to the short-term abnormal returns is the poor return of IPO shares in the long term. The third key anomaly, which is also briefly discussed in this chapter, is the 'hot' and 'cold' initial public offering markets.

3.2.1 Underpricing of IPOs

As mentioned in the latter half of the second chapter, initial public offerings are regularly underpriced. In the exceptionally hot IPO market of 1999 and 2000, underpricing has been, according to Derrien's (2005) estimate, in one-third of the share prices. According to Ritter's (1991) research, buying IPO shares at their offering price and selling them at the end of the first trading day would on average generate a profit of 16,4%. As mentioned earlier, the work of Fama (1998) emphasizes that even in efficient markets momentary, irregular, and unpredictable overreactions and underreactions may occur in the short term. His work suggests that the market would eventually correct the anomaly related to underpricing in the initial public offering. Compared to this view, especially Derrien's (2005) findings are contradictory. In addition, research by Loughran and Ritter (2004) finds that the underpricing of IPOs increased between the 1980s and the IT bubble despite research and investor knowledge. According to research, IPOs were approximately 7% underpriced in the 1980s, 15% underpriced in the 1990s, and during the IT bubble in 1999 and 2000 more than 60% underpriced.

Although according to Fama's (1998) work, equity prices can deviate from the intrinsic value, there should be underreactions and overreactions by chance. Moreover, the rational actors in the equity market should make this anomaly disappear after a while. However, after the findings of Ritter's (1991) study, several studies have found that this anomaly persists. For example, research by Lowry et al. (2010) finds that the underpricing of IPO shares in the years 1965-2005 was approximately 22% on average. The existence of the IPO underpricing anomaly has been proven at least since the First World War. The research by Chambers and Dimson (2009) finds that between 1917 and 1945 the initial public offerings were 3,8% underpriced. The research also finds that between World War II and 1986, the underpricing of IPOs had increased to 9,15%. This anomaly has therefore not only lasted more than a hundred years without disappearing but has intensified from time to time.

The figure 2 below illustrates the number of IPOs, and the average first-day returns between 1980 and 2021 (Ritter, 2023). The red bars depict annual initial public offerings to the main stock exchanges in the United States, and the black line illustrates the average first-day returns of these IPO shares. The figure 2 visualizes, for example, the strong underpricing during the IT bubble. It is also noteworthy that during this period the returns of IPOs have not been negative on average.

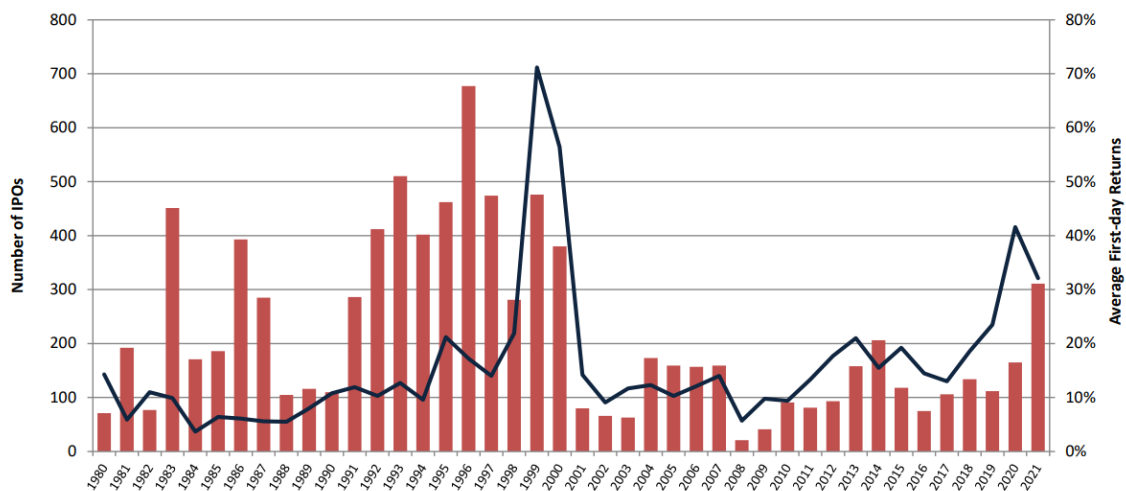


Figure 2. Number of IPOs and average first day returns (Ritter, 2023).

3.2.2 Poor performance of IPO shares in the long run

Another key anomaly related to initial public offerings is their poor performance in the long term. This means that the price development of IPO shares will generate less money for investors in the long term than the shares of comparable companies. According to Ritter's (1991) study, compared to comparable companies' shares, these IPO shares produced 17 percent less in the three years after the initial public offering. The research finds three exceptions to the underperformance compared to industry rivals between 1975 and 1984. However, the study finds that financial institutions, airlines, and drug companies that have gone public have produced better than their competitors, even in the long term. With airlines and financial institutions, for example, underpricing and thus

also short-term profits after initial public offerings are smaller. The shares of the other eleven industries included in the study, correspondingly, have underperformed after three years. According to the study, poor long-term performance of IPOs is negatively correlated with underpricing and high short-term returns. While IPO stocks have traditionally performed well within a few days after going public and poorly over a period of three years, for example, according to the study by Ibbotson and Jaffe (1975), however, over a period of one year these stocks have produced well compared to the benchmark. The suggestion that the underpricing of IPO shares and their underperformance in the future are connected is also supported by findings of the research by Carter et al. (1998). According to the study, the investment banks in the initial public offering process are related to how accurately the shares are priced. If the investment bank has been reputable, there has been less underpricing of shares. Another finding of the research shows that the shares of these companies whose IPO process is participated by more reputable investment banks have better returns in the long term. The reputation of investment banks can be compared with each other using, for example, the Carter-Manaster-system as in the study by Carter et al. Named after its developers, Carter and Manaster (1990), the Carter Manaster system ranks investment banks based on how high they rank in 'tombstone announcements', which are advertisements for IPOs by the investment banks. Several investment banks may be involved in various tasks in the IPO process. In the tombstone announcement, they are listed below, and Carter-Manaster gives investment banks regularly listed in the top decile a grade of 9, and investment banks consistently listed in the bottom decile a grade of 0. Research by Carter et al. (1998) notices that the long-term returns and the reputation of investment banks participating in the IPO process are correlated.

Similar long-term underperformance of IPO shares has also been observed in other studies on stock exchanges in different countries. Research by Cai et al. (2008) finds the same phenomenon in the Shanghai stock exchange where their study estimates the long-term underperformance to be almost a third compared to the benchmark index. Moreover, findings suggesting the existence of an anomaly have been found, for example,

in Finland (Keloharju, 1993), in Australia (Lee et al., 1996), in Canada (Kooli & Suret, 2004), and in Spain (Álvarez & González, 2008).

3.2.3 Hot and Cold IPO markets

The 'hot' and 'cold' IPO markets are the third key anomaly related to initial public offerings (Ritter, 1991). The findings of the study by Ibbotson and Jaffe (1975) show that the returns and number of IPOs vary and form 'hot' and 'cold' IPO markets. As mentioned in the second chapter, their study claims that these 'hot' and 'cold' IPO markets do not appear following a random walk. Moreover, in 'hot' IPO markets, underpricing has been greater and vice versa. The findings of Ritter's (1984) study agree with the findings of the study by Ibbotson and Jaffe (1975) as Ritter's study also finds this serial correlation in the average short-term returns of initial public offerings.

3.2.4 Reasons for the underpricing

A study by Loughran and Ritter (2004) reminds us that the magnitude of underpricing of initial public offerings has been different in different periods. For example, in the 1980s, according to their research, the high short-term returns could be explained by the winner's curse which is a phenomenon where bidding competition drives the price of the object to be purchased higher than its value. In this case, the one who finally gets the object with the highest bid pays too much. According to Rock's (1986) study, there is an information imbalance in the market which means that some investors know how to determine the value of shares better than others. Investors who better determine the company's value will participate in the initial public offering if the offering price of the shares is lower than their intrinsic value. Correspondingly, these investors sell the shares if their price rises above the intrinsic value. In the IPO process, it is more favorable for operators to attract less well-informed investors, so they include an IPO discount to the offer to get uninformed investors to participate in the offering and, characteristic of an

auction, they cause the value of the share to rise higher than the intrinsic value. The findings of a study by Loughran and Ritter (2004) suggest that this phenomenon can partly explain the high short-term initial public offering share returns in the 1980s.

An alternative to the winner's curse to explain the underpricing of initial public offerings is the insurance hypothesis. According to Tinic's (1988) research, IPO process actors can underprice the shares to avoid legal issues caused by a possible negative performance of the IPO stock in the secondary market because this may raise investors' suspicions about the fraudulent determination of the share's offering price. According to this hypothesis, the capital lost due to underpricing is lower in value than the costs caused by possible legal issues.

Shiller's (1990) study claims that besides the information asymmetry or Tinic's (1988) insurance hypothesis, other factors explain the underpricing of initial public offerings. As one such factor, Shiller's research presented the impresario hypothesis. The pricing of the offering price of the investment bank acting as an underwriter in the initial public offering is compared to the pricing of concert tickets. Even if the concert organizer could get more income by raising the price of admission tickets, then the risk of the concert not being sold out increases. Similarly, according to Shiller, underpricing is beneficial for the investment bank in terms of the future. If the demand for the shares is increased by including an IPO discount, it is more likely that the price of the shares will rise in the secondary market. This price increase on the stock exchange creates the impression for investors that the presence of the investment bank in question in future initial public offerings will lead to a price increase on the secondary market.

In the 1990s, underpricing has been exceptionally large and the reasons for the differences compared to other periods have been examined. According to Ritter's research (1984), the magnitude of underpricing is influenced by the riskiness of the listed companies. An example of this riskiness is, for example, the difficulty in the company's valuation due to the uncertainties of the future. The more these risky companies go

public, the stronger the general underpricing of initial public offerings. This hypothesis is called the changing risk composition hypothesis. However, a study by Loughran and Ritter (2004) suggests that the riskiness of companies has not changed so much that this hypothesis alone would explain the differences in underpricing in the 1980s, 1990s, and 2000s. A study by Ljungqvist and Wilhelm (2003) suggests that the incentives hypothesis affects the magnitude of underpricing. In this hypothesis, the benefit to the management of the company from correctly pricing the listing increases the effort to set the offering price higher. The study measures the amount of incentive for the company's management by their share of the company. In periods when the company's ownership has been exceptionally divided and the company's management has not had such a large ownership stake in the company, the underpricing has been greater and vice versa.

Since, according to the findings of the study by Loughran and Ritter (2004), neither of the hypotheses of studies by Ritter (1984) nor Ljungqvist and Wilhelm (2003) does explain the change in underpricing after the IT bubble, they present the change as a result of the change issuer objective hypothesis. This hypothesis includes two reasons for underpricing. First, as mentioned earlier, the company needs to get reputable investment banks as underwriters or otherwise as part of the initial public offering process. Moreover, companies get more appreciation from investors if the investment banks have highly-rated analysts examining the company. Companies may prefer, in a situation where they are getting involved in the IPO process, an investment bank with respected analysts, but which tends to underprice IPOs, over a less reputable investment bank, which would underprice the offering price less. This part of the hypothesis is called the analyst lust hypothesis by the study by Loughran and Ritter (2004). According to the research, the second part of the change issuer objective hypothesis is the spinning hypothesis. The study claims this spinning hypothesis can partly explain the large underpricing during the IT bubble and why underpricing decreased afterward. In spinning, for example, an underwriter can attract key actors of a company planning an initial public offering by creating them brokerage accounts and offering them other underpriced IPO shares. According to the study by Loughran and Ritter, at the beginning

of the 1990s, this was a common way to affect the companies' decisions to select investment banks for the process. This, according to the hypothesis, causes a spiral, when company managers, due to their incentives, choose investment banks that tend to underprice the offerings. Because later the action has been considered not only unethical but also illegal, according to the study, the prohibition of the operation explains why the underpricing of initial public offerings decreased in the 2000s.

One explanatory reason for the underpricing of initial public offerings can also be related to the lock-up period of the individuals or institutions involved in the IPO process. A study by Aggarwal et al. (2002) proposes that the increase in value in the secondary market arising from the underpricing of initial public offerings gathers media attention and analyst coverage, which attracts more investors to buy the company's shares. The study calls this phenomenon information momentum. Since the lock-up period prevents, for example, key players in the IPO process from selling the shares they had before the initial public offering, it is profitable for them that the IPO share price rises on the secondary market even after the lock-up period ends, when they can sell the shares.

3.2.5 Reasons for the poor long-term market returns

The long-term underperformance of IPO stocks has been proposed to be caused by the irrational behavior of investors. According to Miller's (1977) study, irrational investors' optimism about the company's ability to generate cash flows in the future affects the company's share price compared to pessimistic investors' estimates. This is because buying company shares is practically easier than short selling. Eventually, when this investor optimism dissipates, the stock performs poorly. For example, Ikeda's (2022) research finds that investors' optimism and the magnitude of divergence of opinion affect the increase in the value of shares after the initial public offering, which later leads to the underperformance of IPO shares.

Another behavioral explanation for the long-term underperformance of IPO stocks is the propensity of the IPO market for fads as proposed by Shiller's (1990) work. Such fads may, for example, cause investors to behave irrationally optimistically and pay too much for shares. Shiller's work suggests that such a fad may be the result of, for example, the strategy of investment banks, mentioned in the previous sub-section, to create excess demand by underpricing IPOs. After a few years, over-optimistic investors become disillusioned with the company's ability to generate money for its owners, leading to the sale of shares.

Ritter's work (1991) points out the additional benefit to those involved in the IPO process from fads arising in the IPO market. The study suggests that these issuers can benefit from the window of opportunities that over-optimism in the IPO market creates. In this case, it is safer to set the offering price of listings higher, which generates more capital for issuers. According to Ritter's study, the long-term underperformance of IPO shares would be explained by offering prices that have become too high during fads. According to Ritter's study, this strategy can be seen, for example, as the hot IPO market. A study by Loughran and Ritter (1995) agrees that during such a window of opportunities, initial public offerings can be rather overpriced than underpriced, which would eventually lead to long-term underperformance of IPO shares. In addition, the long-term underperformance of IPO shares in the 1975-1984 period was greater for companies with small offering sizes (Ritter, 1991). Similar findings about the importance of the offer size to the long-term underperformance of IPO stocks are found in the study by Cai et al. (2008).

4 ESG and initial public offerings

This chapter discusses socially responsible investing and corporate social responsibility, and their effects on companies' financial and market performance. In addition, this chapter presents previous studies regarding the impact of the aforementioned socially responsible investing and corporate social responsibility on IPO companies and their shares.

According to the work by Renneboog et al. (2008), socially responsible investing (SRI) means the investors considering responsible aspects while making investment decisions. Corporate social responsibility, in turn, describes the company's need to take into account social, environmental, governance, and ethical aspects for its business to be responsible. According to the work of Pedersen et al. (2021), the ESG is for the environmental, social, and governance dimensions of the company's business that the socially responsible investors take into consideration when making investment decisions. According to the work by Dorfleitner et al. (2015), an investment decision can be made, for example, through positive or negative screening. In negative screening, companies whose business is not ethical are left uninvested, and in positive screening, the invested money is allocated to companies that operate ethically.

4.1 The history of socially responsible investing

According to the studies by Renneboog et al. (2008) and Schueth (2003), the history of socially responsible investing is linked to religion. For example, Judaism's holy book, the Old Testament, set restrictions on exploiting others in business. Moreover, in the Middle Ages, the Catholic Church forbade usury. The first investment-related restrictions were set by the Methodist Church in the United Kingdom in the 1920s. At that time, the Methodist Church did not invest in companies that produced, for example, alcohol, tobacco, or weapons. The companies that organized gambling were also 'sinful' and the Methodist Church neither invested in them nor allowed its members to invest in them.

Later in the 20th century, socially responsible investing was formed not only according to the views of religions but as a universal effort to achieve good. As the first modern socially responsible investing fund, the study by Renneboog et al. (2008) mentions the Pax World Fund, which was formed in the 1970s as a way for investors to allocate their investments without them being used for the Vietnam War. This fund did not invest, for example, in the arms industry. Moreover, during apartheid in South Africa, socially responsible investing was used to allocate wealth in such a way that South African companies or those doing business with South African companies were invested less with the help of funds (Schueth, 2003).

Investing based on the SRI factors has grown its popularity in the 21st century. The study by Renneboog et al. (2008) proposes that an important factor behind socially responsible investing is the need of people who have reached a certain standard of living to make ethical choices in their consumption habits. This, in turn, has led to exclusion and forced companies to focus on responsible aspects. This trend has naturally led to unethical companies being associated with new risks from the perspective of investors. According to the Forum for Sustainable and Responsible Investment (2020), where investments based on ESG factors amounted to 639 billion dollars in 1995, they were nearly seventeen trillion dollars in the year 2020. In addition, the growth has accelerated over the last ten years. For example, the growth from 2018 to 2020 was over 40 percent. If this trend continues, it will be impossible for investors to ignore the ESG factors while making their investment decisions in the future (PRI, 2022).

According to work by Schueth (2003), why people invest socially responsibly in general and what has made the trend continue can be explained by two motivators. First, some people want to make investments in a way that makes them feel they are acting ethically. Another group of people, on the other hand, wants to influence the development of society with their investments in a way that ultimately increases the overall quality of life.

The work by Schueth (2003) considers three reasons to be the most important for the growing popularity of socially responsible investing. Work cites the improvement in information availability as possibly the most significant reason. The work claims that investors who have more information at their disposal give more weight to responsibility when making investment decisions. The work mentions the development of equality as a second point. For example, according to their research, women make up a significant part of socially responsible investing, and women's improved income level has offered more and more women the opportunity to invest. Thirdly, the work mentions that socially responsible investing also offers investors a return, so it is not just about charity, but investors have the opportunity to make a profit while acting ethically.

4.2 ESG

The measurement of the corporate social responsibility of a company is typically done by determining how a company succeeds in three ESG categories: environmental, social, and governance. According to the study by Dorfleitner et al. (2015), ESG ratings are specially used for positive screening because there needs to be more comparison between companies in terms of ethics. In negative screening, it can be easy to exclude, for example, all companies that produce weapons, regardless of the ESG dimensions. This has created a demand for ESG rating agencies. The study mentions ASSET4 of Thomson Reuters and Kinder Lydenberg Domini & Co by MSCI as some of the most important ESG rating agencies.

According to the research by Dorfleitner et al. (2015), with the current trend, ESG rating providers also have an impact on the companies' operations. While socially responsible investing is constantly growing, companies are under pressure to act ethically so that rating agencies give the most positive assessments of the various ESG dimensions. For example, a study by Chatterji and Toffel (2010) finds that a company with a low ESG rating invests more to improve different ESG dimensions in the future than a company with a high ESG score. Because socially responsible investing is popular, the study claims

that with a low ESG score, the company is exposed to negative media coverage, which may result in legal issues or protests. On the other hand, the research suggests that such ratings and, therefore, the fact that an independent party points out a clear flaw, the benefit of improving it about the cost is large, turns out to be an opportunity in terms of developing the company's business.

4.3 Influence of corporate social responsibility

The effects of corporate social responsibility on the company's success are often linked to the company's position in the stakeholder model. The work by Donaldson and Preston (1995) describes that according to the stakeholder model, the company interacts not only with its customers, owners, employees, and suppliers but also with everyone else who can potentially benefit from the company, regardless of whether they actively participate in the company's business. According to Godfrey's (2005) study, a corporation that operates socially responsibly accumulates for itself moral capital that reduces its investors' risks. The reduction of this extra risk makes the investment more secure and attractive.

A study by Cheng et al. (2014) finds that a company can benefit from a good CSR reputation, for example in obtaining finance. According to the study, a company that focuses on acting socially responsible has, for example, a more transparent business, which increases information and reduces the risk for investors because it is easier for the company to give information to the market if there is nothing questionable in its business. Secondly, the study refers to the findings of a study by Bénabou and Tirole (2010), according to which a socially responsible company attracts more committed investors instead of speculative investors. When investors and other stakeholders are more committed, it causes fewer expenses for the company.

As a socially responsible company may benefit from positive publicity about its high corporate social responsibility, an irresponsibly operating company may in turn suffer

from negative media coverage. The study by Kölbel et al. (2017) finds that corporate social irresponsibility, the opposite of corporate social responsibility, causes additional risk to the company. Based on the findings, taking corporate social responsibility into account in business is an important part of minimizing risks.

It is also possible that the investor is only looking for companies that will generate as much cash flow as possible in the future rather than making investments based on the ethical reasons described by Schueth's (2003) study. The study by Verheyden et al. (2016) finds that the positive or negative screening mentioned above concerning corporate social responsibility reputation improves the chances of getting returns and reduces excess risk. According to the study, ESG screening significantly reduces especially rapid stock price decreases. Findings propose that screening based on responsible investing offers a viable solution even for investors whose primary interest is not in increasing sustainability with their investments.

However, not all research suggests that responsible investing offers investors an advantage. For example, Krüger's (2015) study finds that companies' shares react negatively on average to both positive and negative corporate social responsibility news. As the reason for the negative reactions to negative CRS news, the study proposes that they imply possible costs for the company from for example sanctions. The study suggests that the negative price reaction in connection with positive CSR news is due to the agency problem. Investors may interpret the information in a way that the money they invest in the company is used to improve the company's public image instead of investments.

Another study by Hawn et al. (2018) examines whether it is relevant to a company's market value and whether it is added to or removed from the Dow Jones Sustainability Index. The study describes that to end up in the Index, a company must first belong to the most responsible tenth in its industry but also promote the process on its initiative. A company can be removed from the index if unethical behavior is detected related to

the ESG dimensions of its business. Although the preliminary assumption of the study is that adding a company to the sustainability index would cause a positive market reaction and removing a company from the index would cause a negative reaction, the findings of the study show that investors do not react to the aforementioned events. Based on the findings of the study, another study by Durand et al. (2019) investigates the same phenomenon and finds similarly that these events have no significant effect on trading volumes or share prices. However, this study finds that companies in the sustainability index receive more attention from analysts. In addition, according to the research, responsible companies have more long-term investors. The study proposes that it is difficult to compare ESG information from different sources, but in the future, as the popularity of responsible investing grows and the methods to compare ESG information improves, the high corporate social responsibility benefits not only the company but also those who have invested in it. The results of the study are similar to the study by Hong and Kacperczyk (2009), according to which companies in sectors considered unethical receive less analyst coverage and have fewer institutional investors.

According to work by Shackleton et al. (2022), the company's management pays attention to socially responsible aspects, especially when the company's stock is performing poorly. This study finds that companies whose shares have performed poorly on the stock market use more resources to increase socially responsible activities in their business. The study suggests that the company's management considers corporate social responsibility to be important and invests in different dimensions of ESG to strategically improve investors' views of the company's future.

4.4 Studies of ESG and IPO

As the research by Chatterji and Toffel (2010) suggest that the manifestation of a high level of corporate social responsibility in different ESG areas reduces the information mismatch between the company and investors, the performance of newly public companies and their relationship with ESG dimensions have also been studied. For

example, the study by Baker et al. (2021) finds that the initial public offerings in countries that have higher MSCI ESG government ratings, which measure the country's companies' standards regarding ESG, tend to be less underpriced. As a possible reason for this phenomenon, the study proposes the disproportion of information between the parties often involved in initial public offerings. The increase in information related to ESG dimensions gives investors more information than before about the risks related to the company's business. On the other hand, the disadvantages related to different areas of ESG may have been less well-known to the investment bank that acts as the underwriter, which can cause misevaluation. As the study by Hong and Kacperczyk (2009) finds that companies with low corporate social responsibility have fewer large institutional investors, the study by Baker et al. (2021) reminds that in the marketing phase of the initial public offering, because these institutional investors end up with a large part of the company's ownership, they can demand that the company's business be more ESG-friendly so that their risks are reduced. The findings of the study suggest that taking the ESG part of the areas into account in the initial public offering process helps to reduce the risk due to uneven information. The underwriter and the issuing company whose business is socially responsible could, based on this, raise more capital from the initial public offering by setting the offering price higher.

According to a study by Reber et al. (2022), consideration of different aspects of corporate social responsibility is especially important in initial public offerings due to the information asymmetry, which raises the risks of both issuers and investors participating in initial public offerings. Due to the growing popularity of corporate social responsibility, companies have increasingly started to publish their reports evaluating their business based on different ESG categories. However, according to the study, some researchers consider this emphasis on the company's sustainability-related issues to be a 'transparency fallacy'. The study refers to another study by Gold and Heikkurinen (2018), according to which the demands of external stakeholders for companies to make their business operations more sustainable rarely actually implement meaningful sustainability-related actions regardless of this increased transparency. In addition, for

example, a work by Gray (2010) criticizes the comparability and veracity of sustainability reports made by companies. The work also criticizes how companies use the word 'sustainability' ambiguously. Work suggests that more precise definitions should be made for this sustainability if its importance to the company is emphasized. According to Gray's (2010) example, it is possible that a company transports water to an area suffering from drought with cargo ships that use fossil fuels, and therefore sustainable and unsustainable actions are not mutually exclusive. As a counterargument to the criticism, the study by Reber et al. (2022) suggests that companies' sustainability reporting is starting to be connected to enough standards that the reports are comparable with each other. Their study examines the performance of companies' initial public offerings and their willingness to publish an ESG report during the initial public offering relationship. According to the findings the idiosyncratic risk is lower for listed companies that have made a voluntary ESG disclosure while going public.

The study by Fu et al. (2023) claims that a company's investment in corporate social responsibility can also help it avoid being delisted from the stock exchange. According to the study, filling in the voluntary ESG disclosure communicates to investors the transparency of business operations and this increased information reduces risks and also affects the company's long-term performance. According to the findings of the study, newly public companies that have voluntarily made ESG disclosure within a year of listing are more likely to remain on the stock exchange. A higher ESG score also correlates with the probability of staying on the stock exchange.

5 Data and Methodology

This chapter begins the empirical part of the thesis. This thesis aims to examine the possible relationship between the market performance of IPO companies and the ESG scores. The first half discusses the data used in the research and the second half the research methods to test the hypotheses.

5.1 Data

Data includes US companies listed on the New York Stock Exchange and Nasdaq between 2010 and 2018, which have Refinitiv Eikon's ESG rating following the year of listing at the latest and have ESG scores throughout the 3 years after the IPO. This period is located between the financial crisis and the Covid-19 crisis. As the figure 2 of Ritter's study (2023) in the third chapter of this study shows, the number of initial public offerings in this period was more or less equal between years.

The ESG ratings of Refinitiv (Thomson Reuters) Eikon's database were chosen to measure the company's consideration of different ESG dimensions for the study because of the comprehension of the database and versatile rating process. Refinitiv itself states (2022) that its ESG research will cover 85 percent of companies with a global market share in 2022. Refinitiv also uses more than 630 ESG-related metrics on which the rating is based. According to the estimates of the study by Berg et al. (2020), Refinitiv's ESG data has been used in over a thousand studies between 2005 and 2020. In addition, many large institutional investors such as BlackRock use Refinitiv's ESG scores in their risk management.

This thesis highlights a peculiar aspect of Refinitiv's ESG scores. The study of Berg et al. (2020) finds that Refinitiv not only publishes new ESG scores for companies every year but also changes the historical ones if, for example, a part of the business that previously had a positive effect on one of the ESG dimensions is later used in a way that negatively

affects one of the ESG dimensions. The study finds that the ESG scores of the same companies in the same years were approximately 20 percent lower in 2020 than in 2018. For the reasons mentioned above, it is important to mention that Refinitiv's data was delivered for this paper by the University of Vaasa at the beginning of December 2022. Besides the companies which are still publicly traded on either NYSE or Nasdaq, the study includes 14 companies that had gone public before 2010 and had ESG scores the next year and two following years after going public, but which have either gone bankrupt or delisted. Since the information provided by private companies is generally less, and non-existent for bankrupt companies, it is possible that Refinitiv will not be able to redefine its historical ESG scores in the same way as it does today with public companies. In terms of the reliability of the results of this study, it can be harmful if the historical ESG scores of the aforementioned companies have remained unchanged due to the lack of new information, while the ESG scores of still public companies have decreased according to the study by Berg et al. (2020). This will be read as one of the key limitations of the study in addition to the small final sample. However, the reliability of the study would be more affected if these companies were completely removed from the sample due to the possible lack of consistency of ESG scores because since the intention is to study the returns of companies with high or low ESG scores, the study would suffer from survivorship bias. If the bankrupt or delisted companies were to be left out of consideration, there would possibly be more companies in the sample whose business is unethical in itself, but which are stable and can, for example, offer free cash flows to investors, in which case the market value of the companies in question would not be affected by a bad ESG rating.

The data for the study is obtained from a variety of sources. Most of the data for the study is from the Refinitiv (Thomson Reuters) Eikon database. The database includes, for example, the offering prices, offering dates, and the gross proceeds of companies listed on the NYSE and Nasdaq. The sizes of the companies in the second and third year are measured by multiplying the share prices with the number of outstanding shares of companies obtained from the Orbis database for companies that have, for example,

gone private or bankrupt and from 10-k and 20-f forms in the EDGAR database for public companies. In addition, the database provided companies' ESG ratings as determined by Refinitiv. For the market return, the closing prices of the S&P500 are obtained from Yahoo Finance. The founding years of companies are obtained from the Field-Ritter dataset.

According to the data, there are 2,554 IPOs between 2010 and 2018. This value includes all events from the Refinitiv (Thomson Reuters) Eikon database with the tag "IPO". There are several cases where there was no offering price, or the IPO was withdrawn. However, the biggest factor that cuts companies out of the original sample is the ESG score given to IPO companies soon enough after the initial public offering. This limited the sample to 201 companies. The ESG scores these companies received from Refinitiv in the year following their initial public offering ranged from 6,70 to 72,03 in the first year, from 6,83 to 76,26 the second year, and from 9,59 to 73,80 in the third year. The figures 3, 4, and 5 below illustrate the distribution of the scores of IPO companies included in the sample.

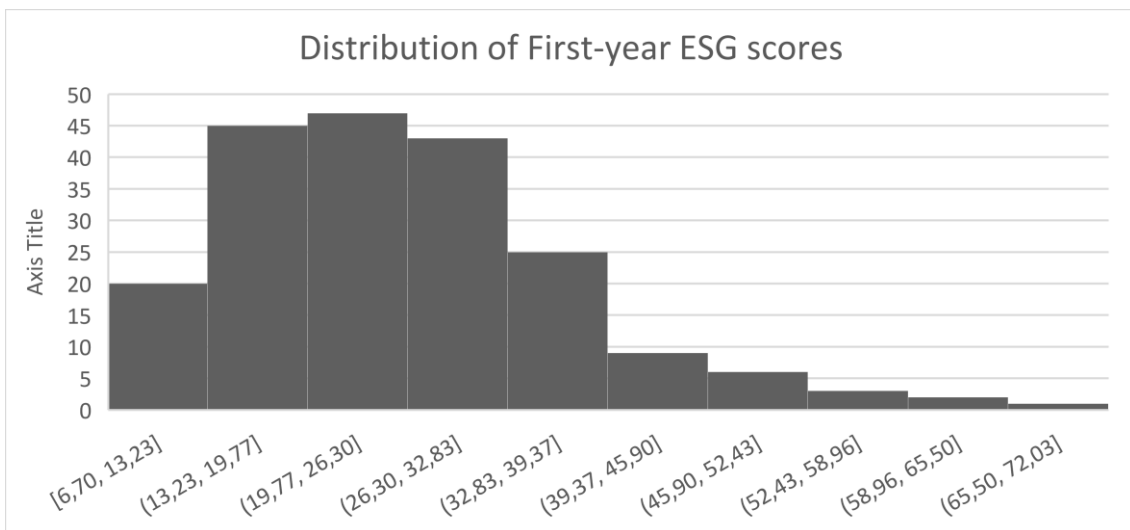


Figure 3. Distribution of First year ESG scores of the companies in the study.

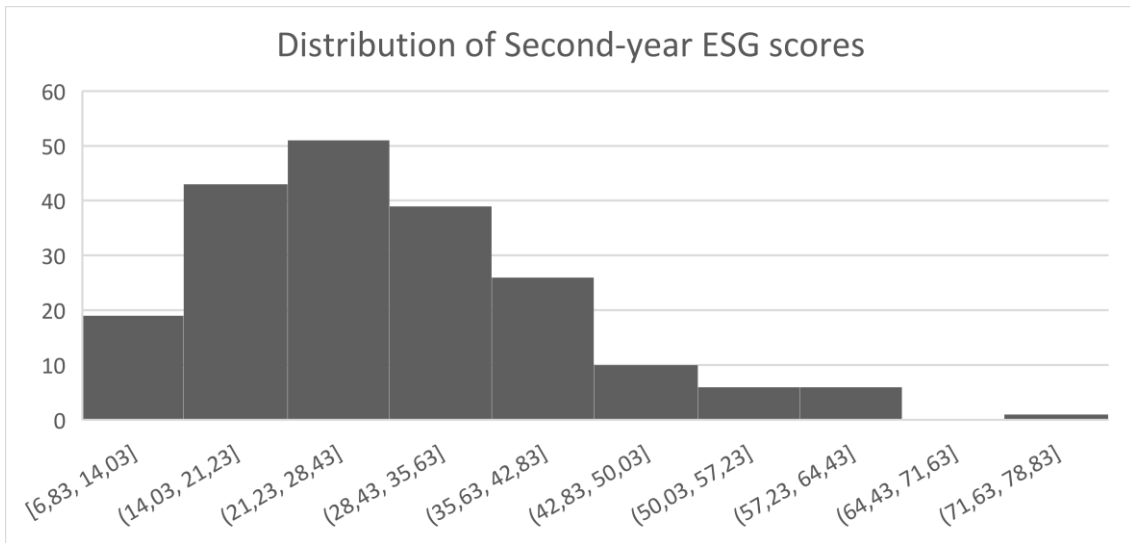


Figure 4. Distribution of Second year ESG scores of the companies in the study.

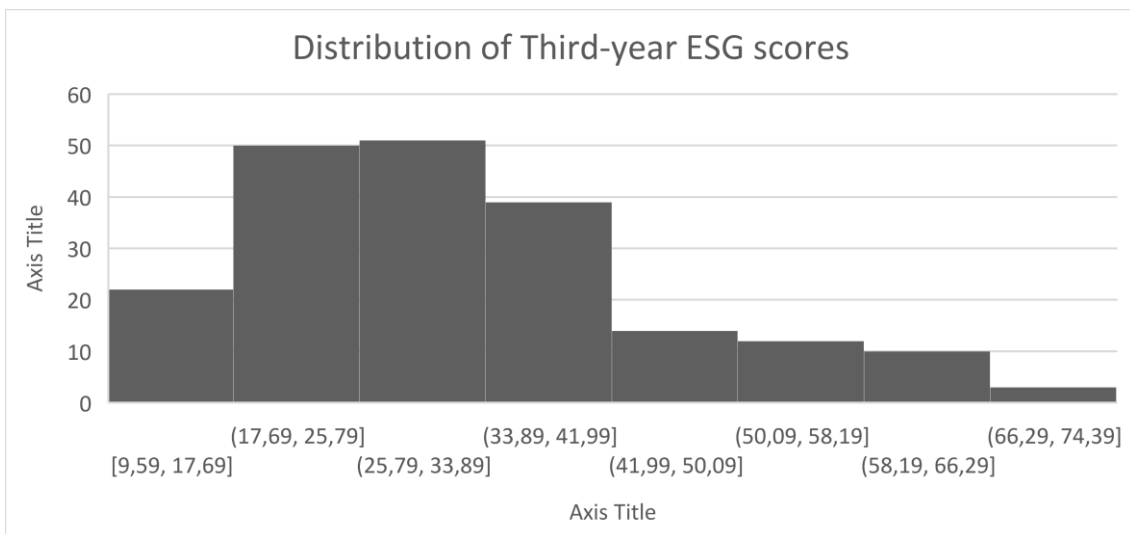


Figure 5. Distribution of Third year ESG scores of the companies in the study.

Based on the figures 3, 4, and 5 above, the ESG scores obtained by IPO companies are not normally distributed between 0-100. It may be possible that rating companies pay more attention to negative ESG dimensions in companies' business, or that IPO

companies do not have the resources to focus on sustainability as initial public offering process takes a considerable amount of attention. Because Refinitiv constantly examines its evaluation criteria and makes changes to historical ESG scores as well, it is possible that the general decrease in the historical ESG scores noticed by Berg et al. (2020) also appears in this study.

Table 1 below shows descriptive statistics of the study. The ages of companies were calculated by deducting the founding year obtained from the Field-Ritter database from the year of initial public offering obtained from the Refinitiv (Thomson Reuters) Eikon's database and adding one each year. Since both the age and the size variables of the companies are strongly positively skewed, a logarithmic transformation will be made in the regressions for these variables to remove the right tails.

Table 1. Descriptive statistics of the variables in years 1 to 3.

		Mean	Median	Std. Dev.	Min.	Max.	Count
Year 1	WR	1,35	1,12	0,97	0,09	6,48	201
	ESG Score	26,08	24,45	11,25	6,70	72,03	201
	Age +1	21,94	12,00	26,85	1,00	144,00	201
	Size (\$M)	410,05	182,61	669,06	3,49	4353,90	201
Year 2	WR	1,09	0,98	0,66	0,17	5,05	201
	ESG score	28,63	27,10	12,09	6,83	76,29	201
	Age +2	22,94	13,00	26,85	2,00	145,00	201
	Size (\$M)	2637,30	927,45	5680,84	47,30	54162,89	201
Year 3	WR	1,22	1,02	1,37	0,10	18,49	201
	ESG Score	32,37	29,46	13,57	9,59	73,80	201
	Age +3	23,94	14,00	26,85	3,00	146,00	201
	Size (\$M)	3103,13	1079,84	5914,03	14,37	53464,38	201

5.2 Methodology

The first part of the study examines the statistical significance of the wealth relatives of IPO companies with high ESG scores and IPO companies with low ESG scores. In this study, the top 10% ESG score IPO firms are included in the high ESG sample whereas the bottom 10% ESG score IPO firms are included in the low ESG sample.

5.2.1 Wealth relatives

Whereas shorter-term performance compared to similar companies, or the benchmark index would be measured by the more common cumulative abnormal returns, in this study, market-adjusted returns of initial public offerings are measured with wealth relatives (WRs). Using wealth relative, the market-adjusted performance of initial public offerings has been measured, for example, in studies by Ritter (1991), Ritter and Loughran (1995), Brav and Gompers (1997), and Carter et al. (2011). The wealth relatives are computed using holding period returns. The formula for holding period return HPR_{it} of security i in time t is as follows:

$$HPR_{it} = \prod_{t=1}^T (1 + r_{it}) - 1 \quad (8)$$

where r_{it} is the return of security i in time t . Using holding period returns, the wealth relative WR_{it} of a company i in time t is computed as follows:

$$WR_{it} = \frac{1 + HPR_{it}}{1 + r_{mt}} \quad (9)$$

where r_{mt} is the return of the benchmark index m in time t . If the wealth relative gets a value of 1.00, the company produces as much as the benchmark index in that period. If

the number is below 1.00, the security is underperforming or if the number is above 1.00, it is outperforming the benchmark (Ritter, 1991).

The null hypothesis of the first test is that the average wealth relative in the group with either high or low ESG IPO shares would not statistically differ from 1.00. For this, the average wealth relatives \overline{WR}_t in time t of these groups are calculated as follows:

$$\overline{WR}_t = \frac{1}{n} \sum_{i=1}^n WR_{it} \quad (10)$$

where the n is the number of securities. The statistical difference between average wealth relative \overline{WR}_t and null hypothesis is measured with Student's (1908) T-test. The formula for calculating test statistic $t - stat$ in one sample t-test is as follows:

$$t - stat = \frac{\overline{WR}_t - 1,00}{\sigma / \sqrt{n}} \quad (11)$$

where n is the sample size and σ is the standard deviation of the wealth relatives in the group. For example, with Microsoft Excel, based on the t-stat and sample size, the p-value can be measured with the TDIST function.

To examine hypothesis 1 of the thesis, the mean wealth relatives of the high ESG score companies and the low ESG score samples are compared with each other using a two-sample t-test. The formula is as follows:

$$t - stat = \frac{\overline{WR}_{1t} - \overline{WR}_{2t}}{\sigma \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad (12)$$

where \overline{WR}_{1t} and \overline{WR}_{2t} denote the mean wealth relative of the high ESG and low ESG sample in time t , σ denotes the pooled standard deviation, and n_1 and n_2 denotes the sizes of the high ESG and Low ESG samples.

5.2.2 Regressions

The latter part of the study includes an OLS Regression with the one-year and panel regression for a three-year period to examine the relationship between the wealth relatives and the ESG ratings. For the one-year wealth relatives WR_i the regression model is as follows:

$$WR_i = \alpha_i + \beta_1 ESG_i + \beta_2 \ln(Size)_i + \beta_3 \ln(Age)_i + \varepsilon_i \quad (13)$$

where α_i is the constant term ESG_i is the Refinitiv (Thomson Reuters) Eikon's overall first ESG score for the company i . In addition, there two common IPO-related control variables $\ln(Size)_i$ is a control variable which is the natural logarithm of the size of the initial public offering of the company and $\ln(Age)_i$ is the natural logarithm of the age of the company at the time of the initial public offering plus one. ε_i is the error term.

Next, a panel regression is conducted to measure the possible relationship between the yearly ESG ratings and the yearly market-adjusted returns for the three-year period. The formula is as follows:

$$WR_{i,t} = \alpha_i + \beta_1 ESG_{i,t} + \beta_4 \ln(Size)_{i,t} + \beta_5 \ln(Age)_{i,t} + \mu_{i,t} \quad (14)$$

Where i denotes the company and t denotes the years from 1 to 3 and $\mu_{i,t}$ denotes the idiosyncratic error.

6 Results

This chapter presents the results of the research. The first half presents the empirical results of the t-tests, and the latter half presents the results of the regressions. ***, **, and * denote the statistical significance at 1%, 5%, and 10% level.

6.1 Wealth relatives of high and low ESG IPO firms

The first empirical study measures with t-tests whether there are significant differences between the wealth relatives of low ESG and high ESG companies. The table 2 presents the one-year wealth relatives for the whole sample, low ESG IPOs, and high ESG IPOs.

Table 2. T-test results, first year wealth relatives.

One-year WRs	All	High ESG	Low ESG	High-Low
Mean	1,35***	1,53**	0,96	0,56***
Standard deviation	0,97	0,90	0,48	0,72
T-statistics	5,07	2,60	0,36	2,47
P-value	0,00	0,02	0,73	0,009
Observations	201	20	20	40
Degrees of freedom	200	19	19	38

As Table 2 illustrates, the first-year wealth relatives for IPO companies with the lowest 10% ESG score are not statistically significant due to the small deviation from the 1,00 compared to the standard deviation of the wealth relatives in the sample. In turn, the mean wealth relative of the initial public offerings of the entire sample but also for IPO companies with the highest 10% ESG score differs from the value of 1.00 of the null hypothesis at the 1% and 5% significance levels. One-tailed two-sample t-test that measures whether the wealth relatives of high ESG companies are significantly higher

than the wealth relatives of low ESG companies shows that the first-year wealth relatives of high ESG companies are approximately 0,56 higher than the first-year wealth relatives of low ESG companies at the 1% significance level. Based on the findings, the whole sample significantly outperforms the benchmark index on average, consistent with the known phenomenon.

Table 3. T-test results, yearly wealth relatives for first three years after the IPO.

Three-year WRs	All	High ESG	Low ESG	High-Low
Mean	1,22***	1,26***	1,05	0,21**
Standard deviation	1,05	0,66	0,64	0,65
T-statistics	5,10	3,06	0,57	1,80
P-value	0,00	0,00	0,57	0,04
Observations	603	60	60	120
Degrees of freedom	602	59	59	118

Table 3 illustrates, similarly to the previous one, that the yearly wealth relatives for IPO companies with the lowest 10% ESG score do not significantly differ from the benchmark index. Similarly, the mean wealth relative of the entire sample but also for IPO companies with the highest 10% ESG score differs from the value of 1.00 of the null hypothesis at the 1% significance level. One-tailed two-sample t-test that measures whether the wealth relatives of high ESG companies are significantly higher than the wealth relatives of low ESG companies shows that the first three yearly wealth relatives of high ESG companies are approximately 0,21 higher than those wealth relatives of low ESG companies at the 5% significance level. Contrary to the findings of the studies by, for example, Ritter (1991), Cai et al. (2008), Keloharju (1993), and Kooli and Suret (2004), the IPO shares in this study did not perform worse than the market index on average.

6.2 The effect of ESG scores to the wealth relatives

The table 4 below presents results from the regression with one-year wealth relatives as a dependent variable, the first-year ESG score as the independent variable, and the natural logarithm of the size of the companies and the age plus one of the companies as control variables. Based on the regression, there is no relationship between the first year's ESG ratings and wealth relatives. The coefficient for ESG is somewhat positive but close to zero and the p-value is high. The relationship between first-year ESG score, and wealth relatives is thus not economically or statistically significant either. The coefficient for the natural logarithm of the gross proceeds of the IPO although small, is significant at the 5% level. A negative coefficient implies that a larger IPO size would reduce short-term high returns. The low value of the R square indicates that the explanatory variables or the control variables have little effect on the first-year wealth relatives. In addition, the low value of F-statistics indicates that the overall relationship between the first-year wealth relatives and the independent variables is void. The variation of the first-year wealth relative is therefore explained by other factors. Contrary to the study by Ritter (1991) this study does not find a relationship between company age and wealth relatives.

Table 4. Regression results with one year wealth relatives as the dependent variable.

WR	Coefficients	Standard Error	t Stat	P-value
Intercept	2,010***	0,392	5,130	0,000
ESG	0,004	0,006	0,632	0,528
LN(SIZE)	-0,074**	0,036	-2,044	0,042
LN(AGE)	0,009	0,074	0,119	0,905
R Square	0,02			
F statistics	1,49			
Observations	201			

Table 5 below illustrates the empirical results of the panel regression with yearly wealth relatives as the dependent variable, yearly ESG scores as the explanatory variable, and the natural logarithm of the yearly size of the companies and age plus one of the companies. Similar to the OLS regression above, the panel regression also shows that due to the high p value, the company's yearly wealth relative and its current year ESG rating do not have a statistically significant relationship. However, company size affects wealth relative negatively and statistically significantly at the 1% level. The F-statistic of the panel regression is high which indicates that the regression is reliable. However, a low R Square indicates that the impact of the variables on the annual wealth relatives is small.

Table 5. Panel Regression results with yearly wealth relatives as the dependent variable.

WR	Coefficients	Standard Error	t Stat	P-value
Intercept	2,000***	0,201	9,958	0,000
ESG	0,002	0,004	0,627	0,531
LN(Size)	-0,133***	0,031	-4,340	0,000
LN(AGE)	0,004	0,049	0,091	0,928
R Square	0,03			
F-statistics	6,84			
Observations	603			

7 Discussion and conclusions

This chapter concludes the study. The first part discusses the empirical results presented in the previous chapter. The second part highlights the limitations of the study and discusses a suggestion for further research.

7.1 Discussion

The first hypothesis of the study suggests that the IPO shares with top 10% ESG scores have significantly higher market-adjusted returns than IPO shares with bottom 10% ESG scores in both the short-term and long-term. The second hypothesis of this thesis suggests that ESG scores have a significant positive effect on the market-adjusted returns of IPO shares in both short term and long term. The empirical tests offer conflicting results, as the results of the t-tests suggest that the shares of IPO companies with a high ESG score performed better than the shares of IPO companies with a low ESG score in the short and long term after IPO, but the regressions did not find a relationship between ESG scores and wealth relatives in the whole sample.

In the short term, the one-sample t-tests show that the returns of the high ESG sample were significantly higher than the benchmark index whereas the returns of the low ESG sample did not differ statistically significantly from the benchmark index. Finally, the one-tailed two-sample t-test supports the first alternative hypothesis as the wealth relatives of the top 10% ESG rating IPO stocks were 0,56 higher than the wealth relatives of the bottom 10% ESG rating IPO stocks and the difference was statistically significant at 1% level.

In the long term, the results are similar. The one-sample t-tests show that the returns of the high ESG sample were significantly higher than the benchmark index. Moreover, the mean yearly return of the whole sample was significantly higher than the benchmark index. This finding, therefore, does not indicate the underperformance of IPO stocks in

the longer term as found in the research of, for example, Ibbotson and Jaffe (1975), Ritter (1991), Loughran and Ritter (1995) or Kooli and Suret (2004). Like the previous t-test, the returns of the low ESG sample did not differ statistically significantly from the benchmark index. Finally, the one-tailed two-sample t-test supports the first alternative hypothesis as the yearly wealth relatives of top 10% ESG rating IPO stocks were 0,21 higher than the yearly wealth relatives of bottom 10% ESG rating IPO stocks and the difference was statistically significant at 5% level. Both of the findings for the two-sample t-tests are consistent with the findings of for example the studies by Fu et al. (2023), Verheyden et al. (2016), and Reber et al. (2022).

While the t-tests support the first alternative hypothesis, the results of the regressions do not support the second alternative hypothesis, because based on the regressions, the effect of ESG scores on market-adjusted returns is found both economically and statistically insignificant. Therefore, the second alternative hypothesis cannot be accepted. All in all, based on the empirical results of this study, it can be concluded that it is beneficial for the performance of the IPO company's stock if the company belongs to the highest decile in terms of the realization of ESG measures compared to the lowest decile. However, neither economically nor statistically significant linear relationship between market-adjusted returns and ESG ratings has been found. Therefore, the findings suggest that in the creation of shareholder value, ESG scores mainly affect the market-adjusted returns of extremes of the rating scale. These findings are similar to the study by Chatterji et al. (2009) that the importance of ESG information is emphasized for extremes. These results would indicate that instead of ESG investors making their investment decisions by comparing IPO companies with similar ESG scores, they would rather either inclusively choose a company with an exceptionally good ESG score or negatively screen the least responsible companies. Although both alternative hypotheses cannot be accepted, the empirical work, using both t-tests and regressions has given a broader understanding of the importance of responsibility in the creation of shareholder value.

7.2 Limitations and suggestion for future research

This section discusses the limitations of this study. A key limiting factor in the study is the small size of the material because Refinitiv (Thomson Reuters) Eikon's database did not find any more IPO companies meeting the research criteria. The biggest factor was not the completely missing ESG score, but the fact that several listed companies did not have a score soon enough. ESG scores were also distributed in such a way that there were few companies with high scores. The sample distribution of this study may mean the same as the study by Berg et al. (2020) finding that ESG scores were later re-evaluated and lowered. Another possibility is that Refinitiv prioritizes in its evaluation companies whose ESG dimensions it detects deficiencies in. A third possibility is that the demanding IPO process takes attention away from focusing on responsibility. Refinitiv seems to have started to improve the rating process of IPOs during the 2010s, as the majority of initial public offerings that had ESG points at the latest in the following year after the initial public offering was in the latter half of the 2010s as the figure 6 illustrates.

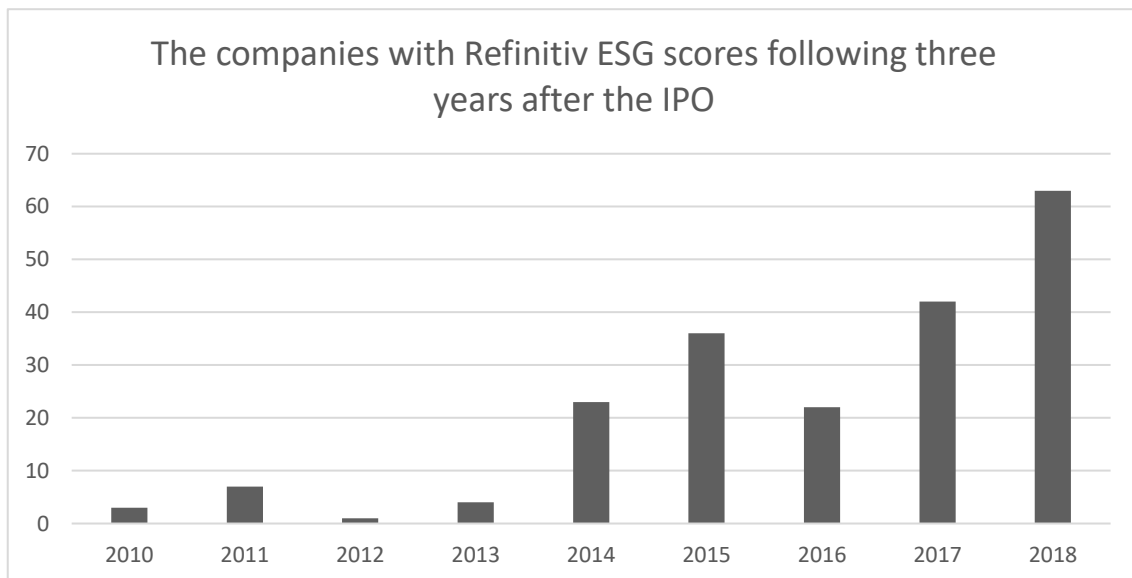


Figure 6. The companies with Refinitiv ESG scores following three years after the IPO.

Another key limitation of the study is related to the reliability of the ESG scores. Refinitiv's practice of reevaluating historical ESG scores based on the present according

to the study by Berg et al (2020). Since some of the companies in the study have gone bankrupt or private, the possible unethical aspects of today's business may go unnoticed due to reduced transparency in the same way as public companies. However, these companies had to be included in the study so that the results would not suffer from a possible survivorship bias.

The results of the study may also be affected by that the study did not take into account the possible cash dividends paid by the companies or that the benchmark index would not serve as a good enough benchmark. Moreover, even the accuracy of the ESG scores provided by Refinitiv (Thomson Reuters) Eikon's database to reflect companies' ability to take the different dimensions of ESG into account can be questioned. According to Chatterji et al. (2009), for example, another leading ESG rating agency KLD's ESG ratings reflect reality better in terms of extremes.

According to the findings of Berg et al. (2019), the ESG scores provided by six key raters correlated only by 0,38 to 0,71 among themselves. To draw conclusions based on the ESG data of these operators, it is necessary to make sure that their ESG metrics are accurate enough. ESG investing is constantly growing in popularity, and in the future, for example, the sample of this type of research will certainly be larger, allowing bolder conclusions to be drawn. Since the results of this study can infer a difference between the ESG extremes, as an alternative to waiting for the formation of more extensive data, it is possible to examine which parts of the ESG score of the companies in question have the greatest impact on these market-adjusted returns.

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