ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS
Bachelor Thesis Economics & Business

How do Underwriter Reputation and Industry Sector affect IPO Underpricing in Italy?

Author: Loet van Ettinger
E-mail: 579350le@student.eur.nl
Student number: 579350
Thesis supervisor: Prof. D. Urban
Second reader: Ruben de Bliek
Finish date: 23-06-2023

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second reader, Erasmus School of Economics or Erasmus University Rotterdam.

Abstract

When firms go public, they sell equity in an Initial Public Offering (IPO). The price for which firms are then listed on exchanges tends to be underpriced. This leads to a significant price jump during the first day of trading. But what explains this phenomenon? Most known theories depend on asymmetric information, but in recent years, the debate has been sparked whether these information-based theories can explain the enormous variation found in the degree of underpricing.

In this thesis, I studied the effect of underwriter reputation and industry sector on the degree of IPO underpricing in Italy. The period considered is March 2000 – May 2023, including 235 IPOs on the Italian stock exchange. To study the phenomenon of IPO underpricing, I constructed a multiple OLS, as well as performing a number of T-tests. Several control variables and dummies for different economic events were added to this regression to isolate the effect of the underwriter and the different industries. Recognized previous literature shows a negative relationship between reputable underwriters and IPO underpricing. However, this finding was not confirmed in this study. Furthermore, this research does highlight the significant effect certain industries have on the degree of underpricing. Sectors such as the Tech sector have been more underpriced in the last decades, consistent with previous findings. Finally, this research also gives new insights into the COVID-19 effect on underpricing, showing IPOs in this period are significantly more underpriced than ex-ante and ex-post IPOs.

Keywords: *IPO, Underpricing, Underwriter, Industry*

Table of Contents

List of Tables

List of Figures

Chapter 1 Introduction

This thesis will study initial public offering (IPO) underpricing on the Italian stock exchange (Borsa Italiana). Underpricing of a stock when it is listed for the first time means that the stock is listed on the stock exchange for a price which is less than its first day closing value, also seen as its actual value by analysts. The first research papers on IPO Underpricing by Ibbotson (1975) and Ritter (1984) both showed that on average, IPOs are underpriced. The degree of underpricing is measured as the difference between the offer price and the first day closing price (Loughran and Ritter, 2004). There have been multiple explanations for IPO underpricing in the last years. In the 1990s, Ritter and Ibbotson (1995) found that asymmetric information is the main explanation for IPO underpricing. Furthermore, Ljungqvist and Wilhelm (2003) find that conflicts of interest and agency problems are strong factors in IPO underpricing. Such problems can arise when there is a misalignment of incentives between the principals (the company and its shareholders going public) and the agents (the underwriters). Furthermore, Rock (1986) considered the "Winners Curse Problem" as an explanation for IPO underpricing. He argued that IPOs must intentionally be underpriced for uninformed (biased) investors to take place in the offerings. This study will rather study the influence of industry effects and the reputation of the IPO underwriter on the degree of underpricing.

In practice, studying IPO underpricing can provide new practical implications for both underwriters and investors. If the firms' industry has a strong reputation for producing successful companies with high growth potential, there may be more demand for its shares and in turn less underpricing. For underwriters, understanding the factors that contribute to underpricing, such as industry specific effects, can help them design better pricing strategies to maximize proceeds from the IPO. Moreover, when the underwriter has a strong reputation for successful and accurately priced IPOs, investors may be more willing to participate in the IPO (and vice versa).

IPO underpricing has been widely studied in the past years. It is known that asymmetric information, conflicts of interest, agency problems and economic conditions contribute to such underpricing. In the Italian market, Cassia et al (2004) found that IPO underpricing decreased in the late 1990s. This was attributable to two determinants: Firstly, the evolution of pricing strategies, which have changed from fixed-price IPOs to bookbuilding. The bookbuilding strategy can reduce the degree of underpricing as the underwriter collects indications of interest from potential investors and uses this information to determine the optimal price at which to offer the shares when going public. Secondly, the segmentation of the Italian Exchange with the birth of a new board for high-growth and technology firms caused the degree of underpricing to decline. Moreover, Cassia et al (2004) showed that IPOs are intentionally underpriced, as both public and private information available at the IPO is only partially incorporated in pricing the shares. Another research on the Italian stock exchange was conducted by Dell'Acqua et al. (2015). Here, they show that the underpricing phenomenon is time-varying, which confirms that economic conditions affect the degree of underpricing, albeit their

sample does not show a positive correlation with hot market periods only. Furthermore, they find that the stock performance, thirty days after the listing, is lower than the average first day return. This suggests that underpricing is mainly a temporary action of price support done by underwriters.

Furthermore, other research by Carter and Manaster (1990) found that underwriter reputation has a significant negative influence on the degree of underpricing. They find that prestigious underwriters are associated with IPOs that have lower initial returns, meaning less underpricing. This is due to the fact that reputable underwriters may offer lower risk IPOs. In turn, with less risk there is less incentive to acquire information by the investor which leads to fewer informed investors participating in the IPO.

This research will use a combination of explanatory variables from previous papers to investigate the relationship of two variables on the degree of underpricing. Firstly, I shall look into the effect of different industries on the degree of underpricing. This is because underpricing can vary significantly between different industries. For example, the technology sector may have higher growth potential and investor demand compared to the basic materials sector, which may lead to different levels of underpricing in tech IPOs. Secondly, underwriter reputation influences the level of underpricing negatively (Carter and Manaster, 1990). This study will seek to confirm these findings in the situation of Italy in recent years. To do this the reputation of the underwriter shall be classified into two categories, reputable and non-reputable, to investigate whether more reputable underwriters do indeed offer lower risk IPOs with a lower degree of underpricing. Finally, four control variables shall be used to isolate the effect of the two main explanatory variables. Firstly, “hot market periods” shall be taken into account. Hot market periods, defined by the number of IPOs in a certain year, influence the degree of underpricing (Dell’Acqua et al, 2015). When in a quarter there are more than 9 IPOs on the Borsa Italiana, the market is considered “hot”. A dummy variable will be used to control for the hot or cold market periods. Secondly, offer size shall be controlled for. Several studies have already found that there is a negative association between firm size and underpricing (e.g., Carter et al. (2002) and Ibbotson et al (1995)). Thus, the offer size shall be used as a proxy for the size of the firm. The offer size is measured as the offer price multiplied by the amount of shares offered. Other firm-specific variables of which the effect on IPO underpricing will be controlled are Return On Assets (ROA) and the leverage ratio.

Furthermore, as there has only been research until 2016 for Italian stocks, the period considered in this study will offer valuable new insights of the effect of two events in Italy on IPO underpricing: the COVID-19 period and the merger of the Borsa Italiana with Euronext, a pan-European stock exchange and market infrastructure. To be able to distinguish the effects of these specific periods, the effects of the financial crisis and recent inflation period shall be controlled for. COVID-19 led to increased volatility in the international stock markets, and this study will analyse whether this has also influenced the degree of IPO underpricing in Italy. Moreover, the merger of the Italian stock exchange with Euronext may have provided more market efficiency and liquidity. This

could significantly affect the degree of underpricing due to markets being more efficient in information processing and markets being more attractive to investors. This will be operationalized by adding dummies which take value 0 for the periods before, and 1 for the periods after. Lastly, this study could give valuable insights into whether industries such as the tech industry, which have been rapidly growing in the COVID-19 period, IPOs have become more over or underpriced since their rapid growth. Thus, this research will aim to clarify how industry sectors and underwriter reputation are related to IPO underpricing while also looking at recent events. Therefore, after summarizing the aforementioned facts, the following research question is formed:

How do underwriter reputation and industry sector affect IPO underpricing in Italy?

The data used in this study is obtained from Bloomberg. This dataset contains all offer prices and future prices of firms that have had IPOs on the Italian stock exchange. The period considered will be from March 2000 till May 2023. This period is chosen because it takes a number of events into account; the financial crisis, COVID-19 and the merger of the Borsa Italiana with Euronext. In this period, 448 IPOs have taken place on the Italian stock exchange. 235 of these IPOs are considered in this study due to incompleteness of observations. These IPOs are only new offerings and not secondary ones. Four control variables will be added to the regression. The two explanatory variables will be computed in the following manner: Underwriter reputation is a dummy, computed by using a ranking which is extracted from Bloomberg. This ranking is based on the market share of each underwriter. Furthermore, industry sector can differ between the following sectors; industrial, utilities, financial, consumer (cyclical and non-cyclical), communications, basic materials, technology and energy. The level of underpricing will be computed as the difference between the offer price and the first day closing price (Ljungqvist, 2007). All the named variables will be put into a multiple (linear) regression to explain the relationship of the explanatory variables on the degree of IPO underpricing.
Finally, I expect to find similar results to previous literature that indicate that IPO underpricing may be negatively related to underwriter reputation and decreasing over the last years. However, I am very curious to see how this phenomenon has evolved over the most recent years in different sectors. Moreover, I am interested to see whether the findings of Carter and Manaster (1990) can be confirmed in Italy's case. Furthermore, there have been a number of crucial events such as COVID-19 in 2020 and the merger in 2021 by Euronext. The effect of these will be answered when the main research question is answered.

Chapter 2 Theoretical Framework

2.1 IPO Process in Italy

Firms going public in Italy start the IPO process by selecting a stock exchange and the pricing mechanism together with its advisor. Following this, a bookrunner and underwriter establish a syndicate to assist in the offering of the shares. After this, a letter of intent is drawn up, which protects the underwriter in the case that the IPO is withdrawn. This letter also determines the gross spread and an overallotment option for the underwriter. This option is typically 15% of the total issue (Cassia et al, 2004). When this is done, the firm must file a registration with the Consob (Commissione Nazionale per le Società e la Borsa), the securities regulator in Italy. After this, the roadshow and book building process start. During the roadshow, firms gather interest from potential investors. Following this, the underwriter starts to solicit bids from interested parties stating the number of shares they are interested in and at which price. Using the information from these bids, the investment bank finally decides the final price of the shares offered.

When going public in Italy there are a number of exchanges on which firms can be listed. On the Italian stock exchange there are four different equity markets. These primary markets allow different companies to gather their financial resources. After the merger of Euronext and Borsa Italiana in April 2021, Euronext changed its names. The main market segment, Mercato Telematico Azionario (MTA), has become Euronext Milan. This is the regulated equity market dedicated to large companies. Furthermore, the MTA (STAR) has become Euronext STAR Milan. This equity market is devoted to mid-sized firms. AIM Italia, the market dedicated to small and mid-sized enterprises (SMEs), has become Euronext Growth Milan. This market is meant for SMEs who wish to gradually access the equity markets and scale ups that have been generating sales for less than one year. Lastly, MIV Italia has become Euronext MIV Milan. MIV is a regulated and specialized market for alternative investment and other investment vehicles which are invested in the real economy.

After having described the IPO process in Italy, I shall now move onto the previous findings on the relationships between IPO underpricing and the variables of interest of this study.

2.2 Previous findings on IPO Underpricing

Much research has been conducted on the topic of IPO underpricing. Over the last decades, different levels of IPO Underpricing (measured as first day return) have been found. Table 1 presents a summary of previous empirical results on the different percentages of IPO underpricing. Thereafter, I shall explain the theories behind these findings.

Table 1: Previous findings on the degree of IPO Underpricing

Authors	Market	Period	Sample	Underpricing %
Hatfield & Rielly (1969)	US	1963-1966	53	9.90%
Ibbotson et al. (1994)	US	1960-1969	2,661	21.25%
Ritter (1984)	US	1960-1982	1,028	18.80%
Ritter (1984)	US	1977-1982	-	26.50%
Beatty & Ritter (1986)	US	1981-1982	545	14.10%
Dark & Carter (1993)	US	1979-1984	1,212	10.60%
Ibbotson et al. (1988)	US	1960-1987	-	16.40%
Loughran & Ritter (2004)	US	1980-1989	1,982	7.30%
Ibbotson et al. (1994)	US	1990-1992	1,1512	10.85%
van Frederikslust & Geest (2004)	Netherlands	1985-1998	106	16.00%
Loughran & Ritter (2004)	US	1990-1998	3,396	14.80%
Ljungqvist & Wilhelm (2003)	US	1996-2000	2,178	35.70%
Schertler (2002)	Germany	1997-2000	803	65.00%
Cassia et al. (2004)	Italy	1985-2001	182	21.87%
Levis (2011)	UK	1992-2005	1,595	18.60%
Dell'Acqua et al. (2015)	Italy	2001-2012	129	6.75%
Ritter (2016)	US	2001-2015	1,664	13.90%
Teti & Montefusco (2022)	Italy	2000-2016	128	8.55%

Note: This table shows a list of some findings of recognized previous empirical research on the topic of IPO underpricing. The market where the research has been conducted is reported, together with the period researched, the sample size (number of IPOs) and the mean underpricing found in the research.

As shown in the table above, IPO underpricing is a recurring phenomenon although it has varied significantly over the last decades. I have chosen these papers to give an impression on the different underpricing levels recognized literature has found in the last decades. Moreover, three

Italian papers have been included to show the average level found in Italy. All levels of underpricing are calculated as the percentage difference between the offer price and the first day closing price. With the US IPO Market being the largest in the world, most research has been conducted in this market. Previous research in Italy shows different levels of underpricing, varying between 6.75% and 8.55% in the period 2000-2016 to 21.87% in the period from 1985 until 2001. Due to such extreme variation in the levels of underpricing, some doubts have risen whether the traditional information-based theories can sufficiently explain IPO underpricing. Therefore, I shall firstly go over these information-based theories. Thereafter, I shall cover other factors influencing IPO underpricing.

2.3 IPO Underpricing & Information Asymmetry

Underpricing is a phenomenon which happens when the stock price of a firm going public is lower than its closing value after the first day of trading. The degree of underpricing is measured as the difference between the offer price and the first day closing price (Loughran and Ritter, 2004).

The first research papers on Initial Public Offering (IPO) Underpricing by Ibbotson (1975) and Ritter (1984) both showed that on average, IPOs are underpriced. Baron (1982) created a model in which IPO underpricing depends on information asymmetries between issuers and underwriters. He casts the IPO market in a principal-agent context, where investment bankers have better knowledge of the capital markets. Here, the investment banker advises the firm on the price and sells the stock at the same time. The compensation for the firm (principal) and the banker (agent) is written as a function of the total IPO proceeds. Baron (1982) subsequently finds that the contract may involve a level of underpricing to induce the agent to put in the right amount of effort. This asymmetry leads to lower IPO prices than without this information asymmetry. Consequently, Muscarella and Vetsuypens (1989) tested this model. On the contrary, they found that self-marketed offerings, investment banks going public and participating in the distribution of their own securities, are characterized by statistically significant underpricing. This is inconsistent with Baron's model and suggests it does not entirely explain the underpricing phenomenon since there is no information asymmetry between the issuer and the investment banker in this case. In the same context of Baron (1982), Ljungqvist and Wilhelm (2003) find that conflicts of interest and agency problems are strong factors in IPO underpricing. Such problems can arise when there is a misalignment of incentives between the principals (the company and its shareholders going public) and the agents (the underwriters).

In Rock's (1986) model, this asymmetry depends upon the existence of a group of investors whose information is superior to that of the firm as well as that of all other investors. If the new shares are priced at their expected value, these privileged investors must crowd out the others when good issues are offered and withdraw from the market when bad issues are offered. Uninformed investors' investments are thus biased toward the less profitable issues. This is also called the "Winner's Curse Problem", which occurs when the winning (uninformed) bidders are those who overestimate the value

of the shares the most. They end up buying the shares at a higher price than they should have. To anticipate this bias of the uninformed investors, the offering firm must price the shares at a discount in order to guarantee that the uninformed investors purchase the issue. However, Ritter's (1984) implications show that if hot-issue markets only occur in certain periods, Rock's (1986) model implies that the risk composition of IPOs is changing over time.

Following this, Allen and Faulhaber (1989) develop a model which assumes the firm itself going public knows its prospects best. Grinblatt & Wang (1989) and Welch (1992) also argue that underpricing is used as a signaling method. They build on the empirical evidence that suggests the existence of 'hot-issue' markets for initial public offerings: in certain periods and in certain industries, new issues are underpriced, and rationing occurs. They show that in certain circumstances, firms with the best prospects find it optimal to signal their 'type' by underpricing their initial issue of shares. Following this knowledge, investors know that only the best can recoup the cost of this signal from subsequent issues.

Apart from the traditional explanations of underpricing due to information asymmetry and risk, there are numerous explanations of underpricing because of aftermarket liquidity. Ellul and Pagano (2006) complement these explanations with a new theory in which investors also worry about the after-market illiquidity that may result from asymmetric information after the IPO. The less liquid the investors expect the aftermarket to be, and the less predictable its liquidity, the larger will be the IPO underpricing.

2.4 Underwriter

In IPOs, investment bankers play a crucial role as intermediaries between firms seeking capital and investors who have financial resources. As shown in previous literature, the need for intermediaries in IPO markets arises due to the presence of asymmetric information. Companies going public possess more detailed knowledge about their future prospects, while investors have greater insights into the terms and conditions under which they provide capital. Both parties have an incentive to protect their informational advantage, but their behavior driven by this advantage creates a gap between issuers and investors. Furthermore, underwriters also decide at which price a firm is listed on the stock exchange. I shall now cover previous findings on the relationship between underpricing and the reputation of the underwriter.

Beatty and Ritter (1986) argue that underpricing occurs due to the reputation of the investment banker, which is at stake. Beatty and Ritter (1986) suggest that investment banks, as repeat actors in the IPO market, have a strong interest in guaranteeing a sufficient level of underpricing in new offerings by building on the theory of the "winner's curse" in their study. They argue that investment banks have an incentive for supporting underpricing in IPOs as they rely on future underwriting commissions. Furthermore, they show that underwriters with stronger reputations are better able to

overcome information asymmetry and attract investor confidence. They observe that IPOs with reputable underwriters experience lower first-day price increases, indicating less underpricing. In line with Beatty and Ritter (1986), Carter and Manaster (1990) found that reputable underwriters tend to offer IPOs with lower levels of risk. As a result, there is less motivation for investors to gather additional information about the IPO, leading to a reduced presence of informed investors participating in the offering. In a later study, Carter et al (1998) found that the underperformance of IPO stocks relative to the market over a three-year holding period is less severe for IPOs handled by more prestigious underwriters. In line with these findings, Dong et al. (2011) find that higher underwriter quality (reputation) predicts superior long-run performance, even when returns are value-weighted. Furthermore, Logue et al. (2002) examine the underwriter role in IPOs in a different manner. They argue that underwriter reputation is a substantial predictor of premarket underwriting activities, but it is only weakly associated with aftermarket price stabilization activities and has no impact on issuer returns. Ellis et al. (2000) also look at aftermarket activities and find that for less successful IPOs, the lead underwriter participates in stabilization activities and uses the overallotment option to decrease inventory risk. The underwriter is compensated primarily through fees, although aftermarket trading generates positive returns that are related to the degree of underpricing.

2.5 Industry

The number of IPOs in a year can differ per industry. This can be influenced by multiple factors, such as industry trends, technological advancements, or other market variables that provide a favorable environment for IPOs in that sector. Jain and Kini (2006) identify industries with significant IPO clustering patterns. IPO clustering is the phenomenon in which a large number of IPOs occur in a relatively short period of time in the same industry or sector. Jain and Kini (2006) evaluate industry characteristics that influence the probability of formation of such IPO clusters. They find that IPO clustering is more frequent in high-growth, fragmented, R&D-intensive businesses with high industry returns and profitability. Industries that require a high level of capital investment or marketing expenses, on the other hand, do not attract IPO clusters. Finally, they find that firms in clustered industries can raise more capital, make greater initial returns, recruit reputable investment bankers, and outspend competitors in the industry on R&D and capital expenditures.

Lowry (2003) investigates industry-specific factors that can play a role in the process of an IPO and finds that industry dynamics play an important role in firms' decisions to go public. Furthermore, she shows that the specific firms' demands for capital is an important determinant of IPO volume, in both statistical and economic terms.

Apart from factors such as capital intensiveness and growth prospects, regulatory changes can influence the willingness of a firm to go public in a certain sector. Changes in regulatory standards can

have a direct impact on the possibility and attractiveness of an IPO in a certain industry. Companies may be discouraged from pursuing an IPO if changes to legislation impose greater compliance standards, additional reporting obligations, or higher expenses of going public. This may result in a reduction in the number of IPOs in the industry. This is contradicted by Cattaneo et al. (2015) who argue that the effectiveness of regulatory interventions in an industry is controversial and largely depends on how they are implemented. Furthermore, Ritter et al. (2012) proposed a different explanation, stating the "regulatory overreach hypothesis", which states that small firms are remaining private due to an increase in the regulatory costs borne by publicly traded firms.

2.6 IPO underpricing, Underwriter and Industry

In line with Beatty and Ritter (1986), Carter and Manaster (1990) discovered that underwriter reputation has a substantial impact on the level of underpricing in IPOs. They found that reputable underwriters tend to offer IPOs with lower levels of risk. As a result, there is less motivation for investors to gather additional information about the IPO, leading to a reduced presence of informed investors participating in the offering. In a later study, Carter et al (1998) discovered that higher reputation underwriters gave a superior certification advantage and appeared to be associated to fewer underpriced IPOs. Dimovski et al (2011) conduct similar research in the Australian IPO market and find that report more money was left on the table by IPOs which had underwriters than those that did not make use of underwriters. Moreover, their results show that more reputable underwriters are associated with a higher level of underpricing, which contradicts previous findings by Carter & Manaster (1990) and Carter et al (1998). Kirkulak and Davis (2005) show that the relationship between underwriter reputation and underpricing is dependent on where the IPO is priced, which reflects the issue's level of demand. There is a positive (negative) and significant relationship between underwriter reputation and the degree of underpricing when demand is strong (low).

As most studies have shown a negative relationship between underwriter reputation and the degree of underpricing (e.g., Carter and Manaster (1990); Megginson and Weiss, (1991); Michaely and Shaw (1994)), this study shall seek to confirm these findings in Italy. Therefore, our first hypothesis is the following:

H1: More (less) prestigious underwriters are associated with lower (higher) degrees of underpricing in IPOs.

Apart from the influence of the underwriter reputation, the level of underpricing can vary between industries due to multiple reasons. Firstly, the growth prospects of a certain industry can

affect the level of underpricing. This is because investors are willing to pay a premium for shares which have high growth potential, making them less underpriced. For example, the technology sector may have higher growth potential and investor demand compared to the basic materials sector, which may lead to lower levels of underpricing in tech IPOs. Moreover, it can be challenging for tech organizations to adapt to new technology while still complying with new regulations because industry standards and technology are growing so quickly. Valuing a tech company can be challenging due to this unpredictability, especially for underwriters who must determine the offer's starting price. Considering this, numerous studies have noted that IPO-related uncertainty may be the cause of some IPOs' underpricing (Rock, 1986; Beatty and Ritter, 1986). For instance, Karlis (2008) finds that Internet stocks are more underpriced than those in more established sectors. These results are a result of investment banks' high degree of uncertainty when assessing the Internet businesses and their resultant undervaluation.

2.7 Hot Market Periods

Ibbotson and Jaffe (1975) demonstrate that the number of new offerings exhibits cycles. Such cycles can be “hot” periods or “cold” periods. These time varying market conditions can help to explain IPO cyclicality (Pástor & Veronesi, 2005). Hot and cold market periods can substantially influence the amount of IPOs in a period. Hot market periods are classified as periods of high investor optimism by Ljunqvist et al. (2006). Derrien (2005) also shows that the overall market conditions and investor sentiment can influence the number of IPOs and their level of underpricing. Ritter (1984) found that on average, IPOs were underpriced by 15% during hot market periods as opposed to 8% during cold market periods. According to research by Loughran and Ritter's (1995), the average underpricing of IPOs increased from 10% to 21% during hot market periods. Furthermore, Ritter (1991) showed that companies that went public in the hot IPO market of the early 1980s experienced higher levels of underpricing than before.

Furthermore, Loughran et al (1994) argue that issuers "time" their IPOs to coincide with moments of high optimism, which is consistent with Lee, Shleifer, and Thaler (1991)'s finding that more firms go public when investor sentiment is strong. Ritter (1984) confirmed this in an earlier study, in which he found that each of such hot market periods was followed by a large and prolonged increase in the volume of initial public offerings. However, Ljungqvist et al (2006) argue that as investor sentiment grows, more lower-quality companies are taken public, resulting in a decrease in average issuer quality. Similarly, Yung et al (2008) show that marginal firms in hot market periods are of lower quality than the average firm prior to this shock. This implies that the dispersion in quality is higher during hot market periods and that the asymmetric information problem is heightened.

Furthermore, Helwedge and Liang (2009) find that the characteristics of firms that go public differ less in hot and cold IPO markets than in the quantity of firms that go public. They show that both hot and cold IPOs are heavily concentrated in the same set of industries, with few differences in profits, age, or growth potential. Their findings suggest that hot markets are more likely to reflect increased investor optimism than changes in adverse selection costs, managerial opportunism, or technological innovations.

Finally, Ljungqvist (2006) shows that firms going public in a hot market underperform in the long run, relative to both the first-day price and the offer price. This shows that there is some sort of overpricing in IPOs in hot market periods, while the stocks still are underpriced in the short run. Furthermore, he argues that the "hot" IPO markets can be explained by irrational investor behavior, showing that investors' tolerance for risk changes with the market conditions.

In line with previous findings (Ritter (1984), Ritter (1991) and Loughran & Ritter (1995)), which suggest IPOs are more underpriced during hot market periods, I form my third hypothesis:

H2: During hot market periods, the average underpricing level of IPOs is higher than in cold market periods.

2.8 Firm Size

Firm size, proxied by offering size, can have an effect on the level of IPO underpricing. Larger firms present less uncertainty to potential investors than smaller firms. Larger firms, for example, have better access to resources critical to their survival and profitability (Finkle, 1998). Several studies have shown a negative relationship between firm size and underpricing, which is consistent findings from multiple papers (e.g., Carter et al, 1998; Ibbotson et al, 1988). Consistent with these findings, Lizińska and Czapiewski (2014) showed that in Poland the pre-issue firm size influences IPO underpricing with higher level of returns for smaller companies. On the contrary, Li et al. (2016) examine IPO underpricing before and after the 2008 financial crisis. They discover that IPOs are less underpriced after the crisis. They look into the effects of firm size on the difference in IPO underpricing and show that small firms experienced less IPO underpricing after the financial crisis than large firms.

Apart from the fact that larger firms may attract better resources, they also are more likely to attract reputable underwriters (Carter et al, 1998). Moreover, smaller firms may be viewed as having poorer performance potential, causing prestigious underwriters to avoid these IPOs in order to prevent any reputation loss from undersubscribed issues, as shown in previous literature (e.g. Carter & Manaster, 1990; Dong et al (2011)).

2.9 Leverage

A firm's structure can have significant influence on the degree of underpricing at its IPO. The existing literature on initial public offerings (IPOs) often implies that a high level of pre-IPO leverage acts as a signal of business quality since it requires managers of a corporation to adhere to strict budget limits. Kim et al (2008) researched the influence of leverage on IPO underpricing and find that debt only serves as a signal of better firm quality for low-tech IPOs, leading to lower underpricing.

On the other hand, a firm which has a high level of debt (leverage) may be perceived as more risky by investors. This is because firms with higher debt levels are more vulnerable to interest rate fluctuations and economic turndowns. In line with this theory, Kim et al (2008) find that for high-tech IPOs, the effect of leverage is indeed the other way around: higher leverage is associated with increased risk and uncertainty as reflected by greater underpricing. Su et al (2004) previously found a similar result in China, showing that the degree of underpricing is positively correlated with pre-IPO leverage.

2.10 Return on Assets

By including return on assets in my analysis, I aim to control whether firms' profitability (proxied by ROA) has an effect on the level of underpricing. If so, this could be because firms with higher profitability experience lower underpricing due to the premium which investors pay for a company with a good track record.

2.11 COVID & Merger of Euronext and Borsa Italiana

COVID had a significant impact on the worldwide stock markets. The financial markets experienced significantly higher levels of volatility and uncertainty. Baig et al (2022) conducted a study into the effect of COVID-19 on the IPO market. They find that IPOs which took place during the pandemic experienced greater information uncertainty compared to those before the pandemic. Moreover, they find that IPO firms in the COVID period experience higher levels of underpricing than previously. Therefore, to confirm these findings in Italy's case, I form my fifth hypothesis:

H3: IPOs which took place during the COVID-19 period experience higher levels of underpricing than previously.

Furthermore, in 2021, the merger between Euronext and Borsa Italiana took place. This was done due to multiple reasons. Firstly, the merged exchange can create a more liquid market due to

investors being attracted by Euronext. As previously mentioned, Ellul & Pagano (2006) find that less liquid markets lead to higher levels of IPO underpricing. Thus, when the market is more liquid, the level of underpricing could decrease. Furthermore, the merger with Euronext can lead to a more transparent market with a bigger pool of investors from both sides of this newly formed group. As previous Considering this, I expect the level of underpricing in IPOs taking place after the merger in April 2021 to be less underpriced than before. Thus, I form my last hypothesis:

H4: IPOs which took place after the acquisition of Borsa Italiana by Euronext experience lower levels of underpricing than before.

2.12 Other periods affecting IPO underpricing

To be able to establish a clear relationship between the COVID and Merger effects, other important financial periods must be accounted for. Firstly, the dot-com bubble does not have to be accounted for in this sample. This is due to the fact that the first observation in this sample is from the 30th of March 2000. By this time, the dot-com bubble had already burst (10th of March 2000), marking the beginning of the downtrend which occurred in the months after.

Furthermore, I shall account for the effects of the financial crisis which started in 2007. During this period, the IPO market was more volatile (Li et al, 2008) and investors became more cautious of investing in new companies (Leow & Lau, 2018), leading to lower demand in IPOs. Because the market was more volatile, it was difficult to establish a fair offer price which led to volatility in the prices of IPO shares.

Lastly, the inflation period which started in March 2022 has been included in this research. March 2022 marked the start of this period as in this month, the Harmonized Index of Consumer Prices (HICP) in the EU rose by 7.5%, the highest monthly increase since May 1985. This also enables me to make a clear distinction between the COVID-19 effects and the inflation effects on IPO underpricing in Italy

Chapter 3 Data & Methodology

In this section I shall elaborate on the data used in this study. I shall start by presenting how the data has been collected and then elaborate on the key variables which shall be used and how they are measured. Furthermore, this part will show how the data will be handled and which statistical methods will be used for my analysis.

3.1 Data

The data which I will use in this quantitative study is obtained from Bloomberg Terminal. This terminal has a specific IPO function which gives detailed information on IPOs and firm specific data in the last years. The sample period for this research runs from 02/01/2000 till 18/05/2023 in which only primary offerings in Italy are taken into account. This shows more than 22 years data with a total count of 535 IPOs. However, to make the dataset ready for a thorough analysis, a number of changes had to be made. For some observations there were firm-specific variables missing such as the Offer size, IPO Underwriter, ROA, or the date of the IPO. I dropped observations containing empty variables and in doing so reduced the sample to a total of 235 IPOs.

The offer to first day close shall be used as dependent variable, as this indicates the level of underpricing. According to Beatty & Ritter (1986), there is no reason to adjust for market returns when considering first-day returns, as market returns are on average very small intra-day. I shall now describe the independent variables (explanatory) used in this research.

Reputable Underwriter

For the data on underwriters, I consulted Bloomberg as well. When using the IPO function, it is possible to extract a table of underwriters in the considered period. This table (shown in the Appendix) shows the number of deals they were involved in and their market share. Whether an underwriter is considered reputable is based on their market share. Considering this, an underwriter is considered reputable when their market share is higher than 1% of the total market share.

Industry Sector

Each firm is classified into one of nine different industries, making Industry Sector a categorical variable. The IPOs in this sample have taken place in the following industries; *industrial, utilities, financial, consumer (cyclical and non-cyclical), communications, basic materials, technology*

and *energy*. Examples of firms included in the named industries have been extracted from the Bloomberg dataset and are the following:

Industrial firms offer manufacturing and industrial services. Examples of utility firms include services like electricity, gas, and water. Furthermore, the *financial* sector included firms like banks, insurance companies and investment services. Furthermore, the difference between *cyclical and non-cyclical consumer services* is that cyclical services are sensitive to economic cycles (e.g., automotive & retail), while non-cyclical firms provide essential products and services (e.g., food and healthcare). Examples of *communications* are the following: telecommunications, media, and broadcasting. Furthermore, firms involved in the *Basic Materials* sector include the extraction and processing of raw materials. Additionally, the *technology* industry is involved in the development, production, and distribution of tech products and services. Lastly, the energy sector entails the exploration, production, and distribution of energy sources.

Hot Market

The third variable in this study is the Hot IPO Market dummy. This dummy variable takes on value 1 when there have been more than nine IPOs in the previous three months, indicating that the IPO market is "hot". The decision to use nine is due to the fact that there were, on average, 2 IPOs per month in the sample (six per three months).

Return on Assets

Return on Assets (ROA) is a financial measure that assesses a firm's profitability in relation to its total assets. It shows how successfully a firm uses its resources to generate profit. ROA is computed by dividing net income by (average) total assets. ROA was winsorized on the 5^{th} and 99^{th} percentile as there were outliers in the sample which skewed the data negatively.

Ln (Offer Size)

The fifth variable in this study is the variable offer size. Offer size provides an insight into the size and magnitude of the IPO. Offer size is measured as the amount of shares offered in the IPO multiplied by the price per share at the IPO. I have taken the natural logarithm of Offer Size to account for extreme values in the sample which skewed the data. This minimizes the skewness towards large values.

Leverage Ratio

Leverage ratio, computed as total debt / total equity, is a financial measure that shows the ratio of a company's total debt relative to its equity. It gives a picture of a firm's debt position and helps in assessing a company's financial leverage. The level ratio was also winsorized on the 1st and 99th percentile as there were outliers in the sample which skewed the data for this variable.

COVID-19 Dummy

The COVID-19 Dummy is a binary variable that takes on value 1 when the IPO has occurred during the COVID-19 pandemic. If the IPO was before March 2020, the variable has value 0. If it was during the pandemic, it takes value 1. The start of the pandemic is seen as the first of March 2020 and the end is seen as the first of March 2022. This decision has been made to make a clear distinction between the COVID-19 period and the inflation period which came in 2022. Moreover, in most EU countries all restrictions were removed by this time.

Merger Dummy

Another dummy variable in this study is the binary variable for the merger between Euronext and Borsa Italiana. This dummy variable takes on value 1 if the IPO occurred after the merger, which took place in April 2021. If the IPO was before this merger, the variable takes on a value of 0.

Financial Crisis Dummy

A final dummy was constructed to account for the effects of the financial crisis on the levels of IPO underpricing. The starting date is seen as July 2007, as default rates on subprime mortgages began to rise sharply that month, signaling the beginning of the subprime mortgage crisis. The end is seen as June 2011, because this marked the end of the Eurozone sovereign debt crisis. Until then, shocks of the financial crisis persisted in the European economy.

Inflation Dummy

Finally, a last dummy was created to account for the effects of the recent inflation period. This period began in March 2022. In this month, the Harmonized Index of Consumer Prices (HICP) in the euro area rose by 7.5%, the highest monthly increase since May 1985. Thus, I use March 2022 as a

starting point for this dummy. When IPOs have taken place after this date, the variable takes on a value of 1. Otherwise, the value is 0.

3.2 Methodology

IPO underpricing, the variable of interest in this study, is measured in the following way:

$$\text{Underpricing (U)} = \frac{P_c - P_{IPO}}{P_{IPO}} \cdot 100\%$$

Here, P_C is the first day closing price of the stock and P_{IPO} is the offer price of the share at the IPO. To calculate the level of IPO underpricing, the offer price is subtracted from the closing price, divided by the offer price, and then multiplied by 100. This is done because the level of underpricing is measured as a percentage.

Furthermore, the extreme values (outliers) of the first-day return and the independent variables will be winsorized to ensure the dataset is not skewed. I have used the "capping" method in which the smallest and largest values within a percentile are replaced by the value of the percentile itself. For ROA, for example, this was on the 5^{th} and 99^{th} percentile as the data was skewed to the right. Furthermore, for Leverage Ratio, I winsorized the 1^{st} and 95^{th} percentile due to the data being skewed to extreme positive values. For the Offer Size variable, I used a natural logarithm to smoothen the distribution of the variable as the original values were skewed to the left due to extreme positive values.

To analyse the data thoroughly and answer the hypotheses the ordinary least squares (OLS) method, combined with multiple tests, shall be used. The multiple regression is as follows:

$$\begin{aligned} Underpricing \; = \; & \beta 0 \; + \; \beta 1 \cdot Reputable \; + \beta 2 \cdot Industry + \beta 3 \cdot HotMarket + \beta 4 \cdot ROA + \beta 5 \\ & \cdot Leverage + \beta 6 \cdot Ln(Offersize) + \beta 7 \cdot FinancialCrisis + \beta 8 \cdot COVID19 + \beta 9 \\ & \cdot Merger + \beta 10 \cdot Inflation \end{aligned}$$

Finally, I conducted a white test to determine if robust standard errors were needed. The P-value of this test was 0.53. Considering this, the null hypothesis of equal variances for the errors cannot be rejected. Therefore, I have decided not to use robust standard errors for the regression.

However, I clustered the standard errors for the different industries. Clustering is done to account for correlated errors between industries, as some industries may experience similar industry-specific factors. This correlation is shown in the Variance Inflation Factors (VIF) table in the Appendix (Table 3, Appendix). Scores in this table show to what degree the value of an independent variable is determined by another variable. Here, when VIF values are above 5 this indicates multicollinearity.

3.3 Descriptive Statistics

Table 2: Descriptive statistics for firms in the sample

	Mean	Std. Dev.	Minimum	Maximum
Underpricing % (winsorized)	9.00%	15.3%	-14.30%	61.10%
ROA (winsorized)	0.137	11.305	-30.90	34.00
Offer Size (in Millions)	170.901	407.665	1.450	2397.760
Leverage Ratio (winsorized)	1.280	1.453	0.001	5.484

Note: N=235

Figure 1

Average Underpricing in Italy from May 2000 – March 2023

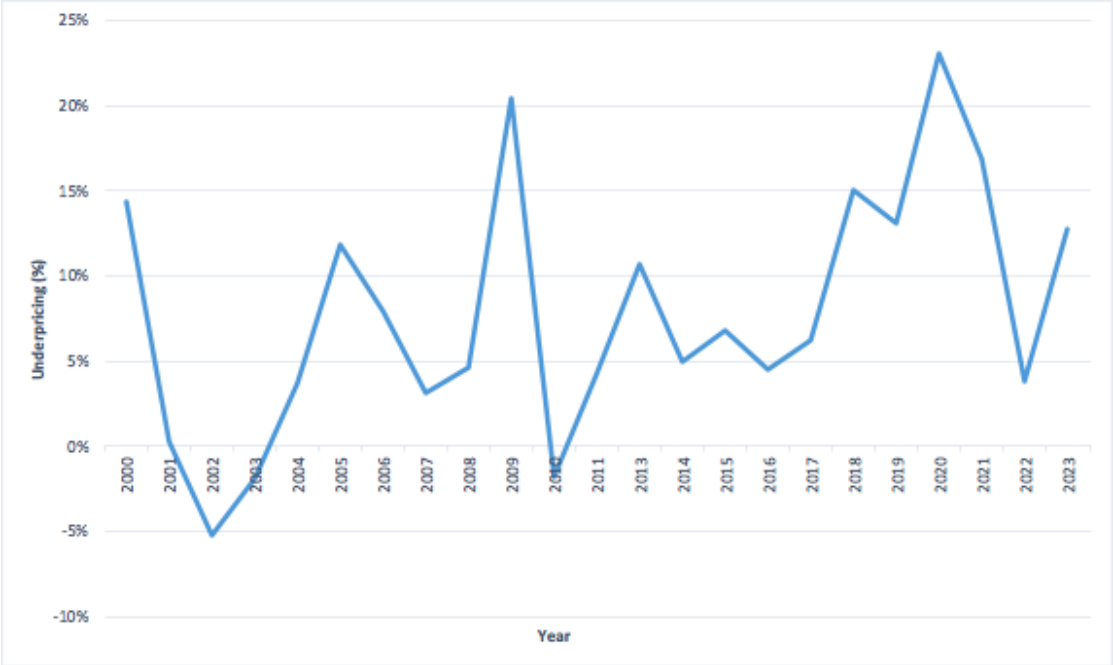

Table 3: Distribution of IPOs in different industries

Industry	Count	Percentage
Basic Materials	3	1.28%
Communications	20	8.51%
Consumer, Cyclical	43	18.30%
Consumer, Non-Cyclical	45	19.15%
Energy	4	1.70%
Financial	29	12.34%
Industrial	56	23.83%
Technology	28	11.91%
Utilities	7	2.98%

N=235

Chapter 4 Results & Discussion

In this section I shall cover the empirical results from this research. To conduct a thorough analysis, I have used STATA to construct multiple OLS regression models and conduct different statistical tests.

To make a clear analysis of the results, I shall go through the different hypotheses first. These hypotheses were constructed to give a clear image of my research expectations. After answering these hypotheses, I shall analyse the results of the multiple OLS regression.

Firstly, I shall discuss the first hypothesis. To answer this hypothesis, a two-sample T-test was conducted (Table 2 in Appendix). The T-statistic corresponding with this test is 2.85, with an associated P-value of 0.01. Therefore, I am able to reject the null hypothesis ($p<0.05$) of equal means (underpricing) between non-reputable and reputable underpricing. Moreover, the P-value associated with the alternative hypothesis which states that the level of underpricing is higher for non-reputable underwriters than for reputable underwriters is 0.02. Therefore, in line with previous findings such as Carter & Manaster (1990), I am able to show that reputable underwriters are associated with less underpriced IPOs.

To be able to test the second hypothesis, another T-test was conducted. Before doing this test, the variances between hot and cold market periods were tested. I tested the distribution and variances with Kolmogorov–Smirnov test and a variance ratio test (Table 5 and 6 in Appendix). Both tests showed insignificant P-values, meaning equal variances and distribution at a significance level of 0.05. Therefore, a T-test assuming equal variances is suited to answer this hypothesis. As shown in table 7 in the Appendix, I am able to reject the null hypothesis which states that the means of both samples are equal. Moreover, the P-value associated with the alternative hypothesis (stating the average underpricing is higher for hot market periods) is 0.05. Therefore, the second hypothesis is confirmed, showing that IPOs are more underpriced in hot market periods compared to cold market period. This is in line with previous findings by Ritter (1984), Ritter (1991) and Loughran & Ritter (1995).

Now, I shall cover the third hypothesis of this thesis. This hypothesis states that IPOs which took place in the COVID-19 period experienced higher levels of underpricing than the periods before and after. To be able to answer this hypothesis a T-test assuming unequal variances is used. The results of this T-test are visible in Table 8 in the Appendix. The T-statistic obtained from the test is –3.37, and a P-value of 0.0009. This enables me to reject the null hypothesis stating the means of both samples are equal. Moreover, it shows that IPOs are more underpriced in the COVID-19 period compared to the period before and after. This is in line with my third hypothesis.

Lastly, I shall cover the fourth hypothesis of this study. This hypothesis states that IPOs which took place after the merger of Euronext and Borsa Italiana experience lower levels of underpricing than IPOs prior to the merger. To be able to thoroughly analyse the effect of the merger, a Wilcoxon Rank Sum test is used (Table 9 in the Appendix). This is to account for the difference in sample size,

as there were only 25 IPOs in the sample after this merger compared to 210 ex-ante merger IPOs. Under the null hypothesis, IPOs have the same distribution and median. The Z-score associated with this test is –1.503, with a P-value of 0.132 (>0.05). Thus, the null hypothesis of equal distributions and medians is not rejected. This means that, in this sample, the post-merger IPOs do not experience significantly different levels of underpricing than IPOs prior to the merger.

On the following page, the results of the multiple OLS regression are shown. I shall analyse the results starting on page 23.

Table 4: OLS regression with winsorized IPO underpricing (%) as the dependent variable and different independent variables / dummy variables. The results are from the 235 Italian IPOs that went public in the period March 2000 - May 2023.

Underpricing of IPOs on the Italian Stock Exchange

Variables	(1) Underpricing (%)	(2) Underpricing (%)	(3) Underpricing (%)	(4) Underpricing (%)
Reputable	-0.041**	-0.035**	0.009	0.011
	(0.0141)	(0.012)	(0.017)	(0.017)
Sector:				
Communications	0.098***	0.119***	0.120**	0.095**
	(0.113)	(0.033)	(0.033)	(0.032)
Consumer, Cyclical	0.070***	0.079**	0.080***	0.061**
	(0.006)	(0.024)	(0.024)	(0.025)
Consumer, Non-Cyclical	0.074***	0.079**	0.080**	0.062*
	(0.008)	(0.027)	(0.027)	(0.028)
Energy	0.053***	0.052***	0.067***	0.067***
	(0.106)	(0.012)	(0.010)	(0.013)
Financial	0.024*	0.036	0.043	0.022
	(0.007)	(0.029)	(0.026)	(0.026)
Industrial	0.061***	0.067***	0.074***	0.06***
	(0.007)	(0.019)	(0.017)	(0.018)
Technology	0.190***	0.197***	0.189***	0.157***
	(0.010)	(0.029)	(0.033)	(0.034)
Utilities	0.057***	0.066***	0.094***	0.069***
	(0.002)	(0.020)	(0.016)	(0.013)
Hot Market		0.019	0.020	0.018
		(0.033)	(0.033)	(0.028)
ROA		0.001	0.013	0.001
		(0.002)	(0.001)	(0.001)
Leverage Ratio		0.005	0.007	0.002
		(0.004)	(0.004)	(0.005)
Ln (Offer Size)			-0.017*	-0.016
			(0.009)	(0.009)
Financial Crisis				-0.050*
				(0.023)
COVID				0.118**
				(0.041)
After Merger				-0.088
				(0.083)
Inflation				0.052
				(0.093)
Constant	0.031	0.007	0.039	0.056
	(0.014)	(0.018)	(0.034)	(0.039)
Observations	235	235	235	235
R2	0.1197	0.1306	0.1491	0.191
Adjusted R2	-	-	-	

Robust standard errors in parentheses

*** p<0.01, **p<0.05, *p<0.1

Note: Basic materials is the reference industry in this table. Adjusted R2 is not reported due to clustering of standard errors of Sector. N= 235

I shall now move onto the empirical results of the multiple OLS regression constructed. In all 4 regressions, the basic materials sector is the reference category. All values in the regression can be seen as percentage changes (0.01 is equal to +1%). Before deciding on what type of standard errors to use, I constructed a VIF table (Table 3 in the Appendix). This table shows values of higher than 5 for a number of sectors, indicating potential multicollinearity. Thus, the standard errors of the different industries are clustered to alleviate this issue by accounting for within-cluster correlation in the sample. Lastly, I conducted a White Test to check whether the errors are homoskedastic. This test gave a test statistic of 96.206 and a P-value of 0.532. Thus, robust standard errors were not needed as the null hypothesis of homoskedastic errors could not be rejected. Moreover, the clustering of the industry standard errors makes the errors robust to heteroskedasticity.

As shown in the table above, multiple regressions were constructed to check for robustness in the explanatory variables. Initially, model (1) shows the relationship between Underpricing and the main explanatory variables of interest; Reputable underwriter and the different sectors. There is a significant negative relationship between reputable underwriters and the level of underpricing, which is in line with previous findings (e.g., Carter & Manaster, 1990). In model (1), a reputable underwriter handling an IPO leads to a 4.1% decrease in underpricing, with a significant P-value of 0.02 ($p<0.05$). When looking at the sectors in the different regressions all sectors (except for the basic materials sector) lead to higher levels of IPO underpricing. As shown in the regression, the basic materials sector is the least underpriced sector. An IPO taking place in the basic materials sector is associated with an average level of 3.1%, as the constant accounts for the reference category in these regressions. All sectors are also significant at a level of 0.05 except for the financial sector. The financial sector is significant at a level of 0.10 and is 2.4% more underpriced than the basic materials sector. Furthermore, the communications sector is 9.98% more underpriced than the basic materials sector. The energy sector is the least underpriced in comparison to the basic materials sector, with a percentage of 5.3%. The Tech sector is the sector which jumps out, as the Tech sector is 19% more underpriced than the basic materials sector. The Technology sector being the most underpriced is in line with previous findings by Karlis (2008). Moreover, this value is highly significant with a P-value of 0.000.

When adding the firm- and market-specific (control) variables, Hot Market, ROA and Leverage Ratio, to the regression as the results slightly change. The decrease in underpricing associated with a reputable underwriter becomes smaller, changing from 4.1% to 3.5%, while still significant ($p<0.05$). The different sectors all stay in a similar range when looking at the level of underpricing. The financial sector is the first and only sector which does not give a significant result. The three control variables which are added to this model all have a positive but insignificant effect on the level of underpricing.

In model 3, one firm-specific variable is added; the natural logarithm of Offer Size. I have added this variable in a separate regression as the sign of my first variable of interest, Reputable, flips

when adding this variable. When Offer Size is added, the level of underpricing changes from a level of –3.5% to 0.9%. Although reputable is insignificant in the third and fourth regression, this would suggest that reputable underwriters are associated with more underpriced IPOs. However, as the value is insignificant and the direction is not clearly defined, I cannot imply any causality. The effect of Offer Size, as a proxy for firm size, is negative and insignificant with a P-value of 0.09 (>0.05). This indicates when Offer Size increases by 1%, the level of underpricing decreases by 1.7%. This is in line with previous research (e.g., Carter et al, 1998; Ibbotson et al, 1988) which shows that firm size and underpricing are negatively related. This also potentially explains why the sign of the reputable underwriter has flipped in the third model. As Carter et al (1998) showed, larger firms are more likely to attract reputable underwriters. When there is no proxy for firm size in the multiple regression, Reputable may be indirectly capturing the effect of firm size as the variables have a correlation of 0.72 (see Table 10 in the Appendix). However, no causal implications can be made as the P-value exceeds the threshold of 0.05.

In model (4), the final model of this study, a number of dummy variables are included in the regression to account for different economic events which have affected the levels of first day returns. These events are the financial crisis, the COVID-19 pandemic, the Merger of Euronext and Borsa Italiana, and the recent inflation period. In model (4), the value for Reputable becomes more positive than in model (3). Although insignificant, Reputable underwriters are associated with a 1.1% increase in underpricing in this final model. When looking at the different sectors, all levels of underpricing decrease slightly in comparison to the basic materials sector in model (3). The level of underpricing for the basic materials sector is 5.6%, as shown in the constant of this model. I shall now start by analysing the most significant sectors. The Communications sector is 9.5% more underpriced than the Basic Materials sector. The Technology sector is also significant ($p<0.05$). This sector is, on average, 15.7% more underpriced than the basic materials sector. This is a substantial difference but is in line with previous literature which showed Tech and Internet stocks experience higher levels of underpricing (Karlis, 2008). The Energy, Industrial and Utilities are 6.70%, 6%, and 6.9% more underpriced respectively than the Basic Materials sector. Furthermore, the two Consumer sectors (Cyclical and Non-Cyclical) are 6.1% and 6.2% more underpriced. Finally, the financial sector is the least significant variable, associated with a 2.2% higher level of underpricing.

When looking at the firm- and market-specific (control) variables, Hot Market, ROA and Leverage Ratio, these variables have the expected sign. Hot Market periods seem to be associated with higher levels of underpricing in the final model. However, the variable is insignificant, meaning I cannot establish any causal relationship. Furthermore, when looking at ROA and Leverage Ratio, these variables are both insignificant and their magnitude is very small. Furthermore, Ln (Offer Size) still has a negative impact of -1.6% on underpricing although it is insignificant. I shall now cover the different economic periods in the final regression.

In the final model, the different sectors all become slightly less underpriced. This effect is indirectly due to the COVID-19 variable being added to the regression. As previously shown, IPOs taking place in the COVID-19 period experience significantly higher levels of underpricing than IPOs ex-ante and ex-post the pandemic. IPOs which took place during the pandemic experienced 11.8% more underpricing in comparison to other IPOs. This value is also significant ($p<0.05$). Furthermore, the financial crisis has a insignificant effect ($p>0.05$) on the level of underpricing. IPOs which took place during this crisis are associated with a 5% lower level of underpricing. This could be due to investors becoming more cautious of investing in IPOs, leading to lower demand (Leow & Lau, 2018). Furthermore, IPOs taking place ex-post the Merger are associated with 8.8% less underpricing compared to the IPOs prior to this event. However, this is not significant, as confirmed earlier in this section by the two sample T-test. Lastly, the recent inflation period seems to have an insignificant positive impact of 5.2% on the level of IPO underpricing. To conclude the results section, I shall cover the R-squared of the models. The R-squared is the percentage of the variation of the model that is explained by the independent variables. The R-squared of the different models rises as more independent variables are added. This shows the variables are adding more explanatory power to the model. The R-squared associated with the final model is 0.191, which means that 19.1% of the variation is explained by the independent variables incorporated in this analysis.

Chapter 5 Conclusion

In this thesis I aimed to examine the relationship between IPO underpricing, reputable underwriters and industry in the case of Italy. As previous literature did not take the same time period and explanatory variables into account, I aimed to study whether the relationship between the most researched variables (underpricing and underwriter) changes when other variables and time periods are taken into account. Thus, I also investigated the effects of different economic events on the level of underpricing. This study gives new insight into how IPO underpricing has evolved over the recent decades, and what variables are of influence on its degree. To be able to make a thorough analysis, the following research question was formulated:

How do underwriter reputation and industry sector affect IPO underpricing in Italy?

Most of the relevant previous literature concluded that reputable underwriters lead to lower levels of underpricing. Furthermore, previous research found that firms in clustered industries can raise more capital and make greater initial returns. Clustered industries are seen as industries in which a large number of IPOs occur in a relatively short period of time (i.e., growth sectors).

Firstly, this study found an (adjusted) average level of underpricing of 9% in the period March 2000 – May 2023. Afterwards, multiple T-tests, variance tests and OLS regressions were conducted to make a thorough analysis. The results of the OLS regression gave a meaningful insight into these researched effects. In the initial regression models of this study, I was able to confirm that reputable underwriters do indeed lead to a lower level of underpricing. However, when controlling for firm size by adding offer size as a proxy, the sign of this effect switched. In other words, this would suggest that hiring a reputable underwriter would lead to higher levels of underpricing. However, this result was insignificant in my final model. Thus, I was not able to make any conclusions on this effect and its relationship with IPO underpricing.

When looking into the different industries, the growth sectors such as the technology sector confirmed previous findings. As tech firms have been one of the highest growth-potential industries over the last decades, this research confirms that tech stocks make greater initial returns (i.e., more underpriced) than other industries. More traditional industries such as the basic materials sector, industrial and utilities sector were associated with the lowest levels of underpricing and were also significant.

The control variables added to the regression did not give much insight into their relationship with underpricing, as they were minimal and insignificant. Still, Offer Size did give a valuable insight into the relationship between firm size and the degree of underpricing. Significant at a level of 0.10, it showed that larger firms (proxied by the IPO Offer Size) experience lower levels of underpricing.

However, when adding the economic events to the regression, this effect became insignificant. The different economic events were; the financial crisis, the COVID-19 pandemic, the merger of Euronext and Borsa Italiana and the recent inflation period. The financial crisis had a negative effect on the level of underpricing, meaning IPOs which took place in that period experienced lower levels of underpricing. While not being significant enough, this was in line with my expectations and knowledge of previous research. Furthermore, the COVID-19 pandemic was significantly associated with higher levels of underpricing. The signs of the effects of the merger and recent inflation period were both as expected, but as they were insignificant, I was unable to draw any conclusions on these relationships.

All in all, this study shows there is a significant effect between different industries and IPO underpricing in Italy. Moreover, valuable insights have been given into the effect of recent economic events on the degree of IPO underpricing. Unfortunately, I was not able to conclude any causal relationship between reputable underwriters and IPO underpricing. However, the changes in the effect of reputable underwriter in the different regressions were logical to explain.

Potential limitations to this study are the limited list of sectors the Bloomberg database returned for this period. When obtaining more specific industries, such as the healthcare sector (which is now incorporated into consumer, non-cyclical) it could be interesting to research how the levels of underpricing have evolved over recent years. Furthermore, for inspiration for further research, I would recommend researching how the degree of underpricing changes in the next few years. As there was no clear significant effect of the inflation period on underpricing, it could be interesting to see whether this changes once there is more data available in the future.

6 References

Allen, F., & Faulhaber, G. R. (1989). Signalling by underpricing in the IPO market. *Journal of Financial Economics*, 23(2), 303–323. https://doi.org/10.1016/0304-405x(89)90060-3

Arugaslan, O., Cook, D.O. and Kieschnick, R. (2004), Monitoring as a Motivation for IPO Underpricing. *The Journal of Finance*, 59: 2403-2420. https://doi.org/10.1111/j.1540-6261.2004.00703.x

Baig, A. S., & Chen, M. (2022). Did the COVID-19 pandemic (really) positively impact the IPO Market? An Analysis of information uncertainty. *Finance Research Letters*, 46, 102372. https://doi.org/10.1016/j.frl.2021.102372

Beatty, R. & Ritter, J. (1986). Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics*, 15, 213-232. 10.1016/0304-405X(86)90055-3.

Carter, R., & Manaster, S. (1990). Initial Public Offerings and Underwriter Reputation. *Journal of Finance*, 45(4), 1045–1067. https://doi.org/10.1111/j.1540-6261.1990.tb02426.x

Carter, R., & Dark, F. H. (1993). Underwriter Reputation and Initial Public Offers: The Detrimental Effects of Flippers. *The Financial Review*, 28(2), 279–301. https://doi.org/10.1111/j.1540-6288.1993.tb01349.x

Carter, R.B., Dark, F.H. and Singh, A.K. (1998), Underwriter Reputation, Initial Returns, and the Long- Run Performance of IPO Stocks. *The Journal of Finance*, 53: 285-311. https://doi.org/10.1111/0022-1082.104624

Carter, R., Dark, F. H., & Singh, A. K. (2002). Underwriter Reputation, Initial Returns, and the Long-Run Performance of IPO Stocks. *Journal of Finance*, 53(1), 285–311. https://doi.org/10.1111/0022- 1082.104624

Cassia, L., Giudici, G., Paleari, S., & Redondi, R. (2004b). IPO underpricing in Italy. *Applied Financial Economics*, 14(3), 179–194. https://doi.org/10.1080/0960310042000187333

Cattaneo, M., Meoli, M., & Vismara, S. (2015). Financial regulation and IPOs: Evidence from

the history of the Italian stock market. *Journal of Corporate Finance*, 31, 116–131. https://doi.org/10.1016/j.jcorpfin.2015.02.001

Dell'Acqua, A., Etro, L. L., Tetia, E., & Murria, M. (2015). IPO underpricing and aftermarket performance in Italy. *Journal of Economic & Financial Studies*, 3(03), 01-14. https://doi.org/10.18533/jefs.v3i03.160

Derrien, F. (2005). IPO Pricing in "Hot" Market Conditions: Who Leaves Money on the Table? The *Journal of Finance*, 60(1), 487–521. http://www.jstor.org/stable/3694845

Dimovski, W., Philavanh, S. & Brooks, R. (2011). Underwriter reputation and underpricing: evidence from the Australian IPO market. *Rev Quant Financial Accounting* (37), 409–426. https://doi.org/10.1007/s11156-010-0211-2

Dong, M., Michel, J.-S. and Pandes, J.A. (2011), Underwriter Quality and Long-Run IPO Performance. *Financial Management*, 40: 219-251. https://doi.org/10.1111/j.1755-053X.2010.01140.x

Ellis, K., Michaely, R. and O'Hara, M. (2000), When the Underwriter Is the Market Maker: An Examination of Trading in the IPO Aftermarket. *The Journal of Finance*, 55: 1039-1074. https://doi.org/10.1111/0022-1082.00240

Ellul, A. & Pagano, M. (2006) IPO Underpricing and After-Market Liquidity, *The Review of Financial Studies*, 19(2), 381–421, https://doi.org/10.1093/rfs/hhj018

Finkle, T.A. (1998). The relationship between boards of directors and initial public offering in the biotechnology industry. *Entrepreneurship Theory and Practice*, 22(3), 5–29. https://doi.org/10.1177/104225879802200301

Frederikslust, Ruud & Geest, Roy. (2004). Initial Returns and Long-Run Performance of Private Equity- Backed Initial Public Offerings on the Amsterdam Stock Exchange. *Journal of Financial Transformation*. 10. 121-127. 10.2139/ssrn.269810.

Grinblatt, M., & Hwang, C. Y. (1989). Signalling and the pricing of new issues. *The journal of finance*, 44(2), 393-420.

Habib, M., & Ljungqvist, A. (1998). Underpricing and IPO proceeds: a note.

Economics Letters, 61(3), 381–383. https://doi.org/10.1016/s0165-1765(98)00201-8

Hatfield, K., & Rielly, F. (1969). Investor experience with new stock issues. *Financial analyst journal,* 73-80.

Helwege, J., & Liang, N. (2004). Initial Public Offerings in Hot and Cold Markets. *Journal of Financial and Quantitative Analysis*, 39(3), 541-569. doi:10.1017/S0022109000004026

Hu, Y., Dai, T., Li, Y., Mallick, S., Ning, L., & Zhu, B. (2021). Underwriter reputation and IPO underpricing: The role of institutional investors in the Chinese growth enterprise market. *International Review of Financial Analysis,* 78, 101956.s://doi.org/10.1016/j.irfa.2021.101956

Ibbotson, R. G., & Ritter, J. R. (1995). Chapter 30 Initial public offerings. *Elsevier eBooks*, 993–1016. https://doi.org/10.1016/s0927-0507(05)80074-x

Ibbotson, R.G., Sindelar, J.L. and Ritter, J.R. (1988), INITIAL PUBLIC OFFERINGS. *Journal of Applied Corporate Finance*, 1: 37-45. https://doi.org/10.1111/j.1745-6 6 22.1988.tb00164.x

Ibbotson, R. G., & Jaffe, J. F. (1975). "Hot Issue" Markets. *The Journal of Finance*, 30(4), 1027–1042. https://doi.org/10.2307/2326721

Jain, B.A. and Kini, O. (2006), Industry clustering of initial public offerings. *Manage. Decis. Econ*., 27: 1-20. https://doi.org/10.1002/mde.1245

Karlis, P. L. (2000), IPO Underpricing, *The Park Place Economist*: Vol. 8 Retrieved from https://digitalcommons.iwu.edu/parkplace/vol8/iss1/17

Kim, J., Pukthuanthong-Le, K., & Walker, T. (2008). Leverage and IPO under-pricing: high-tech versus low-tech IPOs. *Management Decisions,* 46(1), 106–130. https://doi.org/10.1108/00251740810846770

Kirkulak, B., & Davis, C. J. (2005). Underwriter reputation and underpricing: Evidence from the Japanese IPO market. *Pacific-basin Finance Journal,* 13(4), 451–470. https://doi.org/10.1016/j.pacfin.2004.09.004

Lee, C., Shleifer, A., & Thaler, R. H. (1991). Investor Sentiment and the Closed-End Fund Puzzle. *Journal of Finance*, *46*(1), 75–109. https://doi.org/10.1111/j.1540-6261.1991.tb03746.x

Leow, H., & Lau, W. (2018). The Impact of Global Financial Crisis on IPO Underpricing in Malaysian Stock Market. *Review of Pacific Basin Financial Markets and Policies*, 21(04), 1850023. https://doi.org/10.1142/s0219091518500236

Levis, M. (2011), The Performance of Private Equity-Backed IPOs. *Financial Management*, 40: 253-277. https://doi.org/10.1111/j.1755-053X.2010.01141.x

Li, R., Liu, W., Liu, Y., & Tsai, S.-B. (2018). IPO Underpricing After the 2008 Financial Crisis: A Study of the Chinese Stock Markets. *Sustainability*, 10(8), 2844. https://doi.org/10.3390/su10082844

Lizińska, J., & Czapiewski, L. (2014). Performance of Polish IPO Firms: Size and Profitability Effect. *Gospodarka Narodowa*, *269*(1), 53–71. https://doi.org/10.33119/gn/100877

Ljungqvist, A. (2007). IPO underpricing. *Handbook of empirical corporate finance*, 375-422. https://doi.org/10.1016/B978-0-444-53265-7.50021-4

Ljungqvist, A., & Wilhelm, W. J. (2003). IPO Pricing in the Dot-com Bubble. *Journal of Finance*, 58(2), 723–752. https://doi.org/10.1111/1540-6261.00543

Logue, D. E., Rogalski, R. J., Seward, J. K., & Foster-Johnson, L. (2002). What Is Special about the Roles of Underwriter Reputation and Market Activities in Initial Public Offerings? *The Journal of Business*, 75(2), 213–243. https://doi.org/10.1086/338702

Loughran, T., & Ritter, J. (2004). Why Has IPO Underpricing Changed over Time? *Financial Management*, 33(3), 5–37. http://www.jstor.org/stable/3666262

Loughran, T., & Ritter, J. R. (2002). Why Don't Issuers Get Upset about Leaving Money on the Table in IPOs? *The Review of Financial Studies*, 15(2), 413–443. http://www.jstor.org/stable/2696783

Lowry, M. (2003). Why does IPO volume fluctuate so much? *Journal of Financial Economics*, *67*(1), 3–40. https://doi.org/10.1016/s0304-405x(02)00230-1

Michaely, R & Shaw, W. (1994) The Pricing of Initial Public Offerings: Tests of Adverse-

Selection and Signaling Theories, *The Review of Financial Studies*, Volume 7, Issue 2, April 1994, Pages 279– 319, https://doi.org/10.1093/rfs/7.2.279

Megginson, W. L., & Weiss, K. A. (1991). Venture Capitalist Certification in Initial Public Offerings. *The Journal of Finance*, *46*(3), 879–903. https://doi.org/10.2307/2328547

Muscarella, C. J., & Vetsuypens, M. R. (1989). A simple test of Baron's model of IPO underpricing. *Journal of Financial Economics*, 24(1), 125-135. https://doi.org/10.1016/0304-405X(89)90074-3

Pastor, Ľ. and Veronesi, P. (2005), Rational IPO Waves. *The Journal of Finance*, 60: 1713-1757. https://doi.org/10.1111/j.1540-6261.2005.00778.x

Ritter, J. R. (1984). The "Hot Issue" Market of 1980. *The Journal of Business*, 57(2), 215–240. http://www.jstor.org/stable/2352736

Ritter, J. R., Ibbotson, R. G. & Sindelar, J. L. (1994). THE MARKET'S PROBLEMS WITH THE PRICING OF INITIAL PUBLIC OFFERINGS. *Journal of Applied Corporate Finance*, 7(1), 66-74. https://doi.org/10.1111/j.1745-6622.1994.tb00395.x

Ritter, J. R., Signori, A., & Vismara, S. (2012). Economies of Scope and IPO Activity in Europe. *Handbook of Research on IPOs*. https://doi.org/10.2139/ssrn.2169966

Rock, K. (1986). Why new issues are underpriced. *Journal of Financial Economics*, 15(1–2), 187–212. https://doi.org/10.1016/0304-405x(86)90054-1

Schertler, A. (2002). The certification role of private equity investors: Evidence from initial public offerings on the noveau marché and the neuer markt. *UN University*, Institute for New Technologies.

Su, D. (2004). Leverage, insider ownership, and the underpricing of IPOs in China. Journal of International Financial Markets, *Institutions and Money*, 14(1), 37–54. https://doi.org/10.1016/s1042-4431(03)00043-x

Teti, E., Montefusco, I. Corporate governance and IPO underpricing: evidence from the Italian

market. *J Manag Gov* 26, 851–889 (2022). https://doi.org/10.1007/s10997-021-09563-z

Welch, I. (1992). Sequential sales, learning, and cascades. *The Journal of finance*, 47(2), 695- 732. https://doi.org/10.1111/j.1540-6261.1992.tb04406.x

Yung, C., Colak, G., & Wang, W. (2008). Cycles in the IPO market. *Journal of Financial Economics*, *89*(1), 192–208. https://doi.org/10.1016/j.jfineco.2007.06.007

7 Appendix

Table 1: Underwriter Ranking based on Market Share

Underwriter	Market Share (%)	Deal Count
Intesa Sanpaolo	15.23%	101
Mediobanca	16.98%	66
UniCredit	10.13%	46
Goldman Sachs	8.07%	30
BofA Securities	6.13%	28
JP Morgan	5.67%	24
Integrae SIM Spa	0.29%	22
Banca Monte Dei Paschi di Siena SpA	1.59%	20
UBS	4.87%	19
Citi	4.28%	19
BNP Paribas	1.96%	18
Credit Suisse	5.97%	17
Equita SIM SpA	1.47%	14
Envent Srl	0.17%	14
Morgan Stanley	4.49%	13
Credito Emiliano SpA	0.68%	13
Deutsche Bank	1.28%	12
Banco BPM SpA	0.83%	12
CFO Sim Spa	0.43%	9
Lehman Brothers	1.37%	8
Banca Profilo	0.14%	8
Banca Finnat Euramerica Spa	0.12%	8
HSBC	1.32%	7
Barclays	1.18%	7
Mit Societa di Intermediazione Mobiliare SpA	0.12%	7
General Electric Capital Corp	0.30%	6
Banco Popolare SC	0.13%	6
BPER BANCA	0.07%	6
Jefferies	0.37%	5
Unipol Gruppo Finanziario SpA	0.20%	5
Commerzbank	0.47%	4
Intermonte Holding-Societa' di Intermediazio	0.16%	4
Alantra Partners SA	0.09%	4
Banca Popolare di Vicenza	0.09%	4
Rasfin SIM SpA	0.06%	4
Banca Leonardo	0.51%	3
ING Groep	0.24%	3
Societe Generale	0.21%	3
Banca Popolare dell'Emilia Romagna	0.20%	3
Banca Intermobiliare	0.10%	3

Directa SIM SpA	0.02%	3
Fidentiis Equities SA	0.02%	3
Advance SIM Spa	0.02%	3
Cowen & Co	0.38%	2
Nomura	0.34%	2
NatWest Markets	0.21%	2
WestLB AG	0.18%	2
Kepler Cheuvreux	0.13%	2
Joh Berenberg Gossler & Co KG	0.13%	2
Illimity Bank Spa	0.05%	2
Banco Bilbao Vizcaya Argentaria	0.11%	1
Banco Caja Social	0.11%	1
Kempen & Co NV	0.09%	1
Poste Italiane SpA	0.08%	1
Banca di Intermediazione Mobiliare IMI SPA	0.04%	1
Stifel	0.03%	1
Banca Esperia SpA	0.02%	1
Epic Societa di Intermediazione Mobiliare Sp	0.01%	1
Tullett Prebon PLC	0.01%	1
MainFirst Bank AG	0.01%	1
Banca Popolare di Milano	0.01%	1
Iccrea BancaImpresa SpA	0.01%	1
Corp Family Office Sim SpA		1
Canaccord Genuity		1

Note: All IPOs in the original sample are considered here. After determining the market share per underwriter, the dataset was cleaned which led to a smaller total deal count (235).

Table 2: Two-sample t test with equal variances.

	obs1	obs2	Mean1	Mean 2	diff	Std. Err	t value	p value
Underpricing	123	112	0.12	0.06	0.06	0.02	2.85	0.01

Note: H0: diff = mean(0) - mean(1) = 0. Here, 2 stands for a reputable underwriter and 1 for a non-reputable underwriter. The P-value of 0.01 enables me to reject the null hypothesis of equal means. Moreover, the P-value associated with Ha: diff > 0 (meaning reputable underwriters offer less overpriced IPOs on average) is 0.002.

Table 3: VIF Matrix

Variable	**VIF**	**1/VIF**
Reputable	2.36	0.424167
Sector		
Communications	7.96	0.125688
Consumer, Cyclical	13.58	0.073637
Consumer, Non-Cyclical	14.21	0.070395

Energy	2.36	0.424366
Financial	10.29	0.097144
Industrial	16.2	0.061733
Tech	10.05	0.099522
Utilities	3.52	0.283763
Hot_Market	1.2	0.836353
ROA	1.18	0.847816
Ln_OfferSize	2.5	0.399694
Leverage_ratio	1.11	0.896888
Financial_Crisis	1.1	0.910718
COVID	2.55	0.392427
AfterMerger	3.28	0.304936
Inflation	1.99	0.502479
Mean VIF	5.61	

Table 4: Average underpricing in Hot vs Cold Market Periods

	Mean Underpricing	Std.Dev	Freq.
Cold	0.078	0.144	148
Hot	0.112	0.165	87
Total	0.090	0.153	235

Table 5: Two-sample Kolmogorov–Smirnov test for equality of distribution functions

	D	P-value
COLD	0.142	0.109
HOT	-0.015	0.976
Combined K-S	0.1424	0.217

This test shows there is no strong evidence (P = 0.217) against the null hypothesis that the distribution is equal between the Hot and Cold markets. Therefore, a T-test can be used as the assumption of equal distributions is not violated.

Table 6: Variance ratio test

Group	Obs	Mean	Std.err.	Std.dev.	[95 conf.	Interval]
COLD	148	0.078	0.012	0.144	0.054	0.101
HOT	87	0.112	0.018	0.165	0.076	0.147
Combined	235	0.090	0.010	0.153	0.071	0.110

Note: F = 0.7648, Degrees of freedom = 147, 86

H0: ratio = 1 (equal variances)
Ha: ratio < 1
Pr(F < f) = 0.0771

As shown above, at a significance level of 0.05, we cannot reject the null hypothesis of equal variances. Thus, a T-test with equal variances can be used to check whether the levels of underpricing differ in a statistically significant way.

Table 7: Table T-test with equal variances for Hot/ Cold market periods

	Mean HOT	Mean COLD	Diff	Std. Error	T	DF
Underpricing	0.112	0.078	-0.034	0.021	-1.6417	233

Test: Difference = Mean (COLD) - Mean (HOT)

H0: diff = 0

Ha: diff < 0

T = -1.6417

P(T < t) = 0.05

As shown in Table 6, I am able to reject the null hypothesis of equal means. Moreover, the alternative hypothesis stating that the difference between the Cold and Hot average is negative is significant at a 0.05 significance level. This shows the average level of underpricing is higher in Hot market periods compared to Cold market periods.

Table 8: T-test with unequal variances for COVID Dummy

	Mean	Mean COVID	Diff	Std. Error	T	DF
Underpricing	0.075	0.186	-0.111	0.0328748	-3.3688	233

Test: Difference = Mean - Mean (COVID)

H0: diff = 0

Ha: diff < 0

T = -3.3688

P(T < t) = 0.0009

Table 9: Wilcoxon Rank Sum Test for comparing pre-merger to post-merger IPO underpricing.

AfterMerger	Obs	Rank Sum	Expected
0	210	24297	24780
1	25	3433	2950
Combined	235	27730	27730

Unadjusted variance 103250.00

Adjustment for ties -0.62

Adjusted variance 103249.38

H0: U(AfterMerger==0) = U(AfterMerger==1)

z = -1.503

Prob > |z| = 0.1328

The amount of post-merger IPOs is a lot smaller than the pre-merger amount of IPOs. To account for this difference, a Wilcoxon Rank Sum test is used. Under H0, both populations have the same distributions. Moreover, they also have the same median. We are unable to reject the null hypothesis at a significance level of 0.05. Thus, the level of underpricing does not differ significantly before and after the merger.

Table 10: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Reputable	1.00								
(2) Hot Market	-0.13	1.00							
(3) ROA	-0.02	0.12	1.00						
(4) Ln (OfferSize)	0.72	-0.10	0.11	1.00					
(5) Leverage	-0.09	-0.06	-0.04	-0.01	1.00				
(6) Financial Crisis	0.12	-0.04	-0.09	0.02	-0.18	1.00			
(7) COVID	-0.18	0.24	0.11	-0.20	0.13	-0.13	1.00		
(8) AfterMerger	-0.16	0.31	0.15	-0.16	0.03	-0.11	0.63	1.00	
(9) Inflation	-0.05	-0.01	0.14	-0.08	-0.01	-0.05	-0.06	0.47	1.00