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IPO underpricing and aftermarket performance in Italy

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A R T I C L E I N F O	A B S T R A C T
	We analyse a sample of 129 Initial Public Offerings (IPOs) on the Italian Stock Exchange from January 2001 to December 2012. Results confirm the presence of underpricing in two thirds of the sample offerings but with an average level of 6.75% that is far below previous studies. Moreover we provide detailed temporal insights to show that the phenomenon is time-varying, albeit our sample does not show a positive correlation with hot market periods only. The average stock performance 30 days after the listing is lower than average first day return, evidence that is mainly explained by temporary actions of price support by underwriters. Finally, through a series of multivariate regression analyses we find that various factors exercise an influence on the IPO underpricing level, specifically: firm size, aftermarket risk, market demand, financial crisis and shares retention by existing shareholders.

1.0   Introduction

The performance of IPOs is major evidence on international financial markets, with issuing firms experiencing abnormal stock returns on the first day of trading. This initial performance is commonly indicated as IPO "underpricing", that is - "the shares of companies that go public are offered to investors at prices considerably below the prices at which they subsequently trade on the stock market" (Jenkinson and Ljungqvist, 2001). The main consequence of this phenomenon is that pre-IPO owners or the company itself could have sold their shares to the public at higher prices or alternatively could have raised the same amount of money by selling fewer shares. Thus, issuers experience a wealth loss, also known as "money left on the table" (Ritter, 2011). Nevertheless, issuers rarely get upset about underpricing because the offer price is likely to be higher than originally been expected and the loss is compensated with the higher value of stocks in the secondary market. It must be noticed that the amount of "money loss" is often very high: in 2008 the company Visa, the largest IPO in US history, left on the table approximately $5 billion. On the other hand, IPOs can be also overpriced and register a price drop on the listing day, with a consequent wealth transfer from the investors to the firm. The case of Facebook IPO in 2012 is emblematic; in fact the company shares registered a drop in value of 13.1 percent in the first five days of trading, the worst first-week performance of any initial public offering in a decade on the US markets. However, it has been observed that IPOs are underpriced in most stock exchanges and that the degree of underpricing varies from country to country, and from issue to issue in the same country (Loughran et al., 1994). Moreover, empirical evidence shows the existence of some relationships between IPO underpricing and specific determinants, which can either, reduce or increase its level according to market specificities. Previous evidence indicated that the average underpricing in Italy was about 20%, in line with past findings on US and UK IPOs (Arosio et al., 2000; Dalle Vedove et al., 2005).

In this study we provide more recent evidence of the initial performance of IPOs on the Italian Stock Exchange using a unique and updated dataset of listings occurred between January 2001 and December 2012. In addition, we investigate the determinants influencing the underpricing, by employing some of the explicative variables suggested by the literature. These variables refer both to "firm-specific" and "market-specific" factors. Then, looking at the aftermarket performance of IPOs, we compare the return on the 30th day after listing with the initial return. Indeed, studies have detected that companies that go public seem to suffer from aftermarket underperformance. The investigation of this anomaly is also part of our empirical analysis. Our work takes inspiration from research previously published on the same topic, but tries to improve past literature as it also incorporates the aftermath after the events occurred at the end of previous century - beginning of new millennium. Among these, the privatization process of the Italian stock exchange (Borsa Italiana). It was, thus, interesting to investigate whether the efficiency of the market has increased or decreased after these events, and fill the gap by comparing our results to those obtained in previous studies on the subject.

Our analysis, through the evidence of a strong reduction in the average IPO underpricing, confirms a recovery in the efficiency of the Italian stock market, and supports the hypothesis that the introduction of more efficient book building procedures by underwriters gradually reduces the underpricing over time (Cassia et al., 2003). In spite of this, we also highlight the presence of a high average underpricing in the market segments devoted to SMEs and the crucial role of some factors (size, aftermarket risk, demand multiple, timing of the listing and share retention) in affecting the underpricing level. These results may be then addressed both by the stock market regulators in the search for more market efficiency and by the corporate managers when evaluating and preparing the listing.

2.0　Literature review and hypotheses development

2.01　Literature review

The existence of the underpricing phenomenon in IPOs is well known in the literature. There are many explanations to this widely diffused phenomenon, but a unique and commonly accepted motivation does not exist. Many authors suggest that the first day excess return is inevitable due to information asymmetry among the parties involved in the IPO process (Ritter and Welch, 2002). Essentially, explanations advanced by the literature consider the underpricing as the result of a strategy voluntarily undertaken by the issuer to face information asymmetry or rather an unwanted, but accepted, consequence of the interactions between the issuer and the investment bank that manage the offering (Rock, 1986; Welch, 1989; Allen and Faulhaber, 1989; Chemmanur, 1993).

(Rock, 1986) distinguishes between informed and uninformed investors. Informed investors only try to buy underpriced shares in the market, while uninformed ones are not able to discriminate among issues; thus, the latter get only a small amount of the most desirable issues and full allotment of least attractive ones. Due to this adverse selection issue, uninformed investors face a "winner's curse" and pay a price that exceeds the intrinsic value of the shares purchased (Loughran and Ritter, 2003). These investors try to anticipate this risk and ask for some incentives to the issuer: therefore, shares must be offered at discounted price to compensate and convince them to join the offering. This discount will result in underpricing (Wong and Uddin, 2000).

According to Allen and Faulhaber (1989) the issuer is more informed about the present value and the risk of future cash flows than investors, which are not able to discriminate between "good" and "bad" firms. Thus, high-quality issuers use the underpricing as a "costly" signal of the firm's quality. They deliberately sell their shares at a lower price so that low-quality issuers are not able to imitate the strategy, as it is too expensive. This is consistent with the view of Michaely and Shaw (1994). According to the authors, IPOs are deliberately underpriced to "leave a good taste" in investors' mouth. This leads to a better performance in the secondary market and subsequent issues from the same issuer could be placed in the market at higher prices (Zarowin, 1990).

(Welch, 1989) argues that underpricing is a signal of good quality firms, which aim to sell only a small fraction of shares during the IPO and recover the money "left on the table" with subsequent seasoned offerings. Furthermore, the issuer under-prices the issue to motivate the first potential investors to purchase the offering, with a positive "cascade" effect on following investors.

Another explanation for the underpricing relies in the information asymmetry between the issuer and the underwriter (Miller and Reilly, 1987). The investment bank has better information about the potential demand of shares and the capital market than the issuer (Baron, 1982). Thus, the issuer offers the incentive to the underwriter to set a lower price than the first best offer price; in this way, the underwriter is forced to reveal its information and it is encouraged by the issuer to sell underpriced shares (Beatty and Welch, 1996). Moreover, intermediaries are highly risk adverse in pricing the IPO and want to reduce their selling efforts; thus, the delegation of the price is an incentive to sell the issue easily and reflects the willingness of the issuer to accept the consequent underpricing.

According to Shiller (1990) the underpricing is wanted by the underwriter to create the appearance of an excess demand of the issue, while Benveniste and Spindt (1989) state that it induces investors to reveal private information about the demand for shares in the pre-selling phase. Nevertheless, some works relate the underpricing to markets' inefficiency or to irrational behaviours, due to speculation bubbles and market "fads" rather than information asymmetry (Aggarwal and Rivoli, 1990).

Finally, other studies assert that the underpricing level may be related to the uncertainty in the liquidity of the stock in the aftermarket (Ellul and Pagano, 2003); while Booth and Chua (1996) argue that firms are willing to under-price to have a diffuse ownership base and a liquid market for their shares.

Numerous studies tried to test quoted theories, with different empirical evidence and results, not always consistent each other. In conclusion, it is possible to argue that information asymmetry certainly contributes to the explanation of the phenomenon, but it is not the sole determinant, as this study will also demonstrate.

2.02   Hypotheses development

An Ordinary Least Squares (OLS) regression model is used to test the hypothesis of relationship between underpricing and some explanatory variables. Six main explanatory variables are then selected, based on the mainstream IPO literature and findings of previous research works. For each of them we report a test hypothesis.

Market condition (MC): This is represented by the volatility, i.e. standard deviation, of daily returns of the FTSE MIB index over 100 days before the day of listing. If the index volatility is high, then it indicates high uncertainty and reflects pessimism about IPOs.

H1. A negative relationship between good market condition and initial return is hypothesised (Beatty and Ritter, 1986; McGuinnes, 1992; Clarckson and Merkley, 1994; Kumar, 2007).

Underwriter Reputation (UR): a dichotomous variable that takes value 1 for reputable underwriters and 0 for non-reputable ones. We assume that the number of deals taken from Bloomberg made by an underwriter in the IPO market is a reflection of its reputation.

H2. Lower risk offering and, consequently, lower initial returns are expected for IPOs managed by prestigious underwriters (Carter and Manaster, 1990; Booth and Chua, 1996; Johnson and Miller, 1988; Kim and Ritter, 1999).

Demand Multiple (DM): it reflects the level of IPO subscription, as measured by the total number of demanded shares divided by the whole amount of shares offered in an IPO. When the demand exceeds supply, then the closing price on the listing day is likely to rise and the IPO is subsequently subject to high initial returns.

H3. A positive influence of the level of oversubscription on the initial return is expected (Rock, 1986; Koh and Walter, 1989; Keloharju, 1993; McGuinness, 2009).

Hot Periods (HOT): "hot/cold" periods are defined by the number of IPOs issued in each calendar quarter. A hot market condition occurs when the number of IPOs is high, defined here as more than 4 issues per calendar quarter. To this end, we construct a dummy variable, which assume a value of 1 for hot market periods, and 0 for cold market periods.

H4. The initial return of IPOs listed in hot periods is expected to be higher than the one of IPOs listed in cold periods (Ritter, 1984; Helwege and Liang, 2002).

Listing Board (LB): The Italian Stock Exchange is divided into different market segments. The Mercato Telematico Azionario (MTA) has stricter rules of admission and requires a minimum free float of 25% as well as audited financial statements for at least 3 years preceding the listing application. Secondary markets have less stringent requirements.

H5. IPOs of firms listed on the MTA are expected to be less underpriced than IPOs of firms listed in other market segments: Mercato Expandi, Nuovo Mercato and Alternative Investment Market Italia. (Dalle Vedove et al., 2005).

Crisis (CR): A dichotomous variable, where CR=1 if the IPO is listed after 2007, 0 for IPOs in the previous period. The variable is used to control for sample bias due to the global financial crisis that became apparent in 2007 with the stock market crashes.

H6. The recent crisis is expected to have a negative impact on underpricing (Uddin and Raj, 2012).

In addition to these six main explanatory variables, eight control variables are selected, consistently to what is investigated in the major IPO literature (Leland and Pyle, 1977; Banz, 1981; Reinganum, 1981; Ritter, 1984; Beatty and Ritter, 1986; McGuinnes, 1992; Grinblatt and Hwang, 1989; Clarkson and Simunic, 1994; Chowdry and Sherman, 1996; Wong and Uddin, 2000; Kiymaz, 2000; Loughran and Ritter, 2003; Ghosh, 2005; Gleason, Johnston and Madura, 2008; Uddin, 2001): size (SIZE); age (AGE); retained ownership (RO); offering size (GP); belonging to financial industry (FIN); aftermarket risk (BETA); time length of the offering (LGP); greenshoe option (GS).

We use a multivariate regression model to investigate the combined effect of the explanatory variables and determine which ones are significant to explain the IPO underpricing level, as follows (Equation 3):

$$MAIR_i = \alpha + \beta_1 SIZE_i + \beta_2 AGE_i + \beta_3 RO_i + \beta_4 LGP_i + \beta_5 FIN_i + \beta_7 BETA_i + \beta_8 MC_i + \beta_9 UR_i + \beta_{10} DM_i + \beta_{11} HOT_i + \beta_{12} TLAG_i + \beta_6 LB_i + \beta_{13} CR_i + \beta_{14} GS_i + \varepsilon_i (3)$$

We run a set of multiple regression models using the stepwise procedure. We start including all the possible explanatory variables and gradually eliminate some of them to improve the consistency of our model. In order to tackle the heteroskedasticity issues in the error term we adjust the statistics by using the Huber-White robust standard errors.[1] Furthermore, the sample includes some observations that have extreme values, which could bias the results of the statistical test. In order to reduce the impact of these outliers we apply type I winsorisation at 1% level.[2]

3.0   Data and methodology

3.01   Sample and data sources

We examine 129 IPOs listed on the Italian Stock Exchange during the period 2001-2012. We consider only new listings through public offering, thus the sample does not include equity carve-outs, secondary offerings by companies already listed on other markets or segments or readmitted in the list, nor did seasoned public offerings of companies already trade in foreign Stock Exchanges. Furthermore, we consider IPOs of companies that went public on the Main Market segment, Mercato Telematico Azionario (MTA), and the Alternative Investment Market Italia (AIMIT), or on the cancelled equity market segments named Mercato Expandi (ME) and Nuovo Mercato (NM).

After the screening, we collect the relevant data for each IPO in order to determine the underpricing on the first day of trading and on the 30th day after listing. We have also collected data about the variables used in the regression models to explain the underpricing level. Data are mainly extracted from IPOs prospectuses, daily press, Borsa Italiana reports and electronic databases. In particular, Bloomberg and Datastream databases are used to gather financial historical data about IPO prices and the market index.

Table I – Frequency of IPOs and capital raised (in million euros)					
Year	No. IPOs	Offering for sale	Public Offer	Total Gross Proceeds	% of total GP
2001	18	1,691.25	2,178.20	3,869.44	16.6%
2002	6	413.16	639.16	1,052.32	4.5%
2003	4	485.62	66.75	552.38	2.4%
2004	8	2,278.40	352.06	2,630.45	11.3%
2005	15	1,552.43	1,061.67	2,614.11	11.2%
2006	21	3,736.17	1,055.66	4,791.83	20.5%
2007	29	3,008.22	1,364.34	4,372.56	18.7%
2008	6	3.08	128.45	131.53	0.6%
2009	5	93.48	58.34	151.82	0.7%
2010	8	2,496.11	45.89	2,541.99	10.9%
2011	5	378.92	58.56	437.48	1.9%
2012	4	112.61	71.06	183.67	0.8%
Total	129	16,249.46	7,080.12	23,329.58	100%

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[1] We do not assume homoskedasticity and normality of the random standard error terms, but we want consistent results. With the robust option, the point estimates of the coefficients are exactly the same as in ordinary OLS, but the standard errors take into account issues concerning heterogeneity and lack of normality.
[2] Type I winsorisation commonly refers to the procedure of replacing outliers with the exact value of interval limit.

Figure 01: Breakdown of sample IPOs by listing market segment
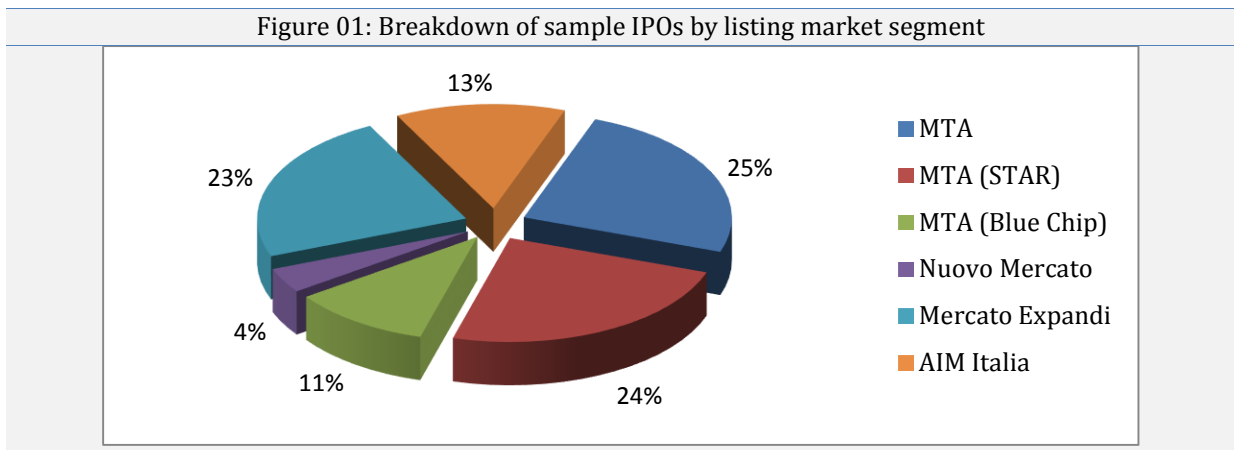
3.02　Methodology

The initial performance on the first day of trading is measured using the conventional method of the raw initial return (RIR), as follows:

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

Where $RIR_{i,t}$ is the raw initial return on the 1st day of IPO listing; $P_{i,0}$ is the offer price of company i, and $P_{i,1}$ is the first day closing price. The closing price is used to measure IPO's initial performance, as it is a price concept that reflects equilibrium price determined by the demand and supply forces of the market. Data are collected from Datastream database using the Unadjusted Price data type, i.e. the closing price as it was historically determined on the Stock Exchange, without taking into account later operations.

Equation (1) should be used in case of perfect market conditions, without opportunity costs and no time lag between the closing date of the subscription period of the shares and the first day of trading. During this period much information can be revealed and changes may happen in the market. For this reason, the raw initial return should be adjusted for market changes, by taking into account movements of the FTSE MIB Index, recognised as the overall indicator of the market performance. The market adjusted initial return (MAIR) is calculated as follows (Equation 2):

$$MAIR_{i,t} = \left[\frac{P_{i,t} - P_{i,0}}{P_{i,0}} - \frac{MI_{i,1} - MI_{i,0}}{MI_{i,0}} \right] \qquad (2)$$

Where $MAIR_{i,t}$ is the market adjusted initial return on the 1st day of IPO listing; $MI_{i,0}$ is the market index at the end of the subscribing period of shares of company i, and $MI_{i,1}$ is the market index at the end of the first trading day of company i. In this study we compute the underpricing using both methods, although the second equation provides a better measure of initial return.

4.0　Results and discussion

4.01　Underpricing and "money left on the table"

Results indicate that the initial performance is not homogeneously distributed over time. The mean raw underpricing for the whole sample of 129 firms is equal to 6.52%, while the adjusted underpricing is 6.75%. These findings are far below the average 21% first day excess return for 164 IPOs listed in Italy from 1985 to 2000 (Arosio et al., 2000).

Cassia et al. (2003) suggest that the progressive reduction of underpricing is related to the adoption of more efficient bookbuilding methods, which allows underwriters to collect precise information about the demand of shares from institutional investors.

The IPO underpricing trend seems to have strong correlation with market conditions, with the exception of the surprisingly high values recorded in recent years following the worldwide financial crisis (Dell Acqua et al., 2013). Furthermore, it is evident that in the initial period 2001-2003 IPOs are on average overpriced and this can be ascribable to the concomitant economic downturn and the frozen liquidity in the equity market. Almost 70% of

IPOs experienced a positive performance on the first day of trading, whilst 30% of the sample recorded a price drop. Amongst the positive value of RIR are also considered 11 IPOs that have an initial return equal to zero.

Table II – IPOs mean initial return by listing year						
Year	IPOs	Raw underpricing (%)			Adjusted underpricing (%)		
		Mean	Positive	Negative	Mean	Positive	Negative
2001	18	-0.71%	10	8	-0.33%	7	11
2002	6	-0.46%	3	3	2.70%	5	1
2003	4	-2.26%	1	3	-1.50%	1	3
2004	8	3.30%	5	3	3.68%	5	3
2005	15	11.42%	12	3	10.93%	11	4
2006	21	9.68%	18	3	10.15%	19	2
2007	29	3.17%	20	9	3.93%	20	9
2008	6	7.81%	4	2	7.89%	4	2
2009	5	22.48%	5	0	20.50%	5	0
2010	8	8.93%	5	3	8.99%	4	4
2011	5	10.29%	4	1	9.56%	3	2
2012	4	22.71%	3	1	19.20%	3	1
Total	129	6.52%	90	39	6.75%	87	42

Table III – Distribution and statistics of raw and adjusted underpricing				
Panel A				
Distribution	RIR		MAIR	
	No. IPOs	%	No. IPOs	%
Less than 0	39	30.23%	42	32.56%
0-4.99	32	24.81%	28	21.71%
5-9.99	19	14.73%	24	18.60%
10-19.99	23	17.83%	22	17.05%
20-29.99	9	6.98%	6	4.65%
30-49.99	5	3.88%	6	4.65%
Over 50	2	1.55%	1	0.78%
Total	129		129	
Panel B				
Descriptive Statistics	RIR		MAIR	
Mean (%)	6.52%		6.75%	
Standard Deviation	0.1291802		0.124	
1st Quartile (%)	-0.97%		-1.10%	
Median (%)	3.73%		3.51%	
3rd Quartile (%)	11.18%		11.80%	
Minimum (%)	-20.00%		-14.90%	
Maximum (%)	67.57%		66.41%	
Skew-ness	1.720		1.869	
Kurtosis	7.528		7.892	

The results suggest significant level of dispersion in the initial returns; the standard deviations of RIR and MAIR are 0.129 and 0.124 respectively. Indeed, simple initial return range from -20% to 67.57%, whilst MAIR range from -14.9% to 66.41%.

Table IV – Raw and adjusted underpricing under industry classification				
Sectors	No IPOs	RIR (%)	Std. deviation	MAIR (%)	Std. deviation
Industrial					
-Oil & Gas	4	-0.79%	0.082	0.93%	0.062
-Chemicals	3	0.23%	0.041	0.41%	0.048
-Construction & Materials	5	13.80%	0.302	13.65%	0.296
-Industrial Goods & Services	23	3.39%	0.093	4.08%	0.093

-Automobiles & Parts	4	8.31%	0.038	8.35%	0.044
-Food & Beverage	4	14.72%	0.186	15.53%	0.167
-Personal & Household Goods	17	9.09%	0.148	9.18%	0.142
-Health Care	6	6.70%	0.098	7.01%	0.086
-Technology	13	7.16%	0.141	7.34%	0.132
Total	79	6.64%	0.136	7.04%	0.130
Financial					
-Banks	2	11.32%	0.080	11.62%	0.059
-Insurance	1	7.11%	-	6.02%	-
-Real Estate	3	5.25%	0.141	6.03%	0.105
-Financial Services	18	5.78%	0.090	4.96%	0.092
Total	24	6.23%	0.091	5.69%	0.088
Services					
-Retail	3	-0.92%	0.092	-0.78%	0.062
-Media	3	11.10%	0.122	10.69%	0.122
-Travel & Leisure	6	-1.81%	0.060	-1.85%	0.047
-Utilities	14	10.57%	0.164	11.40%	0.157
Total	26	6.45%	0.141	6.86%	0.137
Total	129	6.52%	0.129	6.75%	0.124

Table V – Raw and adjusted underpricing under different categories					
Panel A: Raw and adjusted underpricing under market classification					
Market	No. IPOs	RIR %	Std deviation	MAIR %	Std Deviation
MTA	32	4.17%	0.112	4.38%	0.106
MTA (STAR)	31	4.43%	0.113	5.34%	0.107
MTA (Blue Chips)	14	1.35%	0.078	2.54%	0.065
Nuovo Mercato (NM)	5	-2.60%	0.065	-2.11%	0.046
Mercato Expandi (ME)	30	9.58%	0.111	9.60%	0.107
AIM Italia (AIMIT)	17	16.32%	0.196	14.85%	0.202
Total	129	6.52%	0.129	6.75%	0.124
Panel B: Raw and adjusted underpricing under age classification					
Age Group	No. IPOs	RIR %	Std deviation	MAIR %	Std Deviation
0-5	36	4.57%	0.068	4.17%	0.066
6-10	18	7.98%	0.131	8.27%	0.129
11-15	18	11.02%	0.133	11.24%	0.131
16-20	21	6.36%	0.143	6.79%	0.132
21-25	10	12.18%	0.268	12.41%	0.255
26-30	7	9.29%	0.080	10.39%	0.081
Over 30	19	0.77%	0.081	1.60%	0.073
Total	129	6.52%	0.129	6.75%	0.124
Panel C: Raw and adjusted underpricing under demand multiple classification					
Demand Multiple	No. IPOs	RIR %	Std deviation	MAIR %	Std Deviation
0-1	9	-1.48%	0.050	-1.20%	0.049
1-1.99	58	4.57%	0.144	4.57%	0.138
2-2.99	19	2.78%	0.080	4.01%	0.072
3-4.99	16	4.96%	0.059	5.14%	0.053
5-9.99	19	14.38%	0.088	14.41%	0.088
More than 10	8	23.04%	0.162	23.04%	0.153
Total	129	6.52%	0.129	6.75%	0.124
Panel D: Raw and adjusted underpricing under time lag classification					
Time lag	No. Ipos	RIR %	Std deviation	MAIR %	Std Deviation
0-2	12	15.52%	0.161	13.85%	0.167
3-4	17	7.69%	0.130	7.84%	0.127
5-6	79	6.22%	0.129	6.47%	0.124
>6 days	21	1.57%	0.082	2.87%	0.074
Total	129	6.52%	0.129	6.75%	0.124

Panel E: Raw and adjusted underpricing under deal value classification					
Deal Value	No. IPOs	RIR %	Std deviation	MAIR %	Std Deviation
< 20 mln	36	12.56%	0.170	11.85%	0.170
20 – 49.99 mln	24	2.99%	0.103	4.11%	0.097
50 – 99.99 mln	16	2.26%	0.062	2.52%	0.060
100 – 200 mln	28	7.82%	0.127	8.01%	0.120
More than 200	25	2.50%	0.080	3.25%	0.073
Total	129	6.52%	0.129	6.75%	0.124
Panel F: Raw and adjusted underpricing under market capitalization classification					
Market Cap	No. IPOs	RIR %	Std deviation	MAIR %	Std Deviation
< 50 mln	26	10.53%	0.1244	9.88%	0.1243
50 - 250 mln	50	5.46%	0.1441	5.83%	0.1399
250 - 500 mln	24	6.86%	0.1115	7.41%	0.1041
500 mln - 1 bln	16	5.91%	0.1409	6.32%	0.1351
> 1 bln	13	2.74%	0.0822	3.35%	0.0682
Total	129	6.52%	0.129	6.75%	0.124

Panel A of Table V reports the breakdown of IPOs based on the listing market. It is not surprising that the worst initial performance is registered by the companies listed on the NM. These IPOs mainly refer to high tech and high growth companies gone public in 2001, immediately after the burst of the "Internet bubble". Conversely, the best performance is registered by IPOs listed both on the ME and AIMIT. These results indicate that small and medium enterprises, which are the target of these markets, tend to have higher level of underpricing on the first trading day. Indeed, these companies are younger, riskier, less profitable and characterized by higher valuation uncertainty (Giudici and Roosenboom, 2004; Dell'Acqua et al., 2012).

From Panel B of Table V, we infer that the mean company age across the sample is equal to 16 years, a declining value over time due to the advent of "new markets", as also argued by Giudici and Roosenboom (2004). Companies with a long operating history in the market are those recording the lowest level of underpricing.

Panel C provides a classification based on the level of IPO subscription at the end of the offer period. These findings show that IPOs of firms with high subscription rate are associated with higher levels of underpricing, suggesting a clear relationship between level of subscription and underpricing.

From Panel D, it emerges that the time lag for the sample tested is usually short and equal to five days on average. Surprisingly, IPOs with short time lag have the highest initial return. These IPOs are mainly listed in secondary markets, where negotiations can start soon after the admission to listing. On the contrary, IPOs with longer listing delay record the lowest level of underpricing. Both Panel E and Panel D show the distribution of IPOs according to their size. Results suggest that lowest deal value IPOs record the highest adjusted return. In the sample, small IPOs are more underpriced than large IPOs, except for companies with a deal value between €100 and €200 million. Furthermore, small or medium capitalized firms observe higher levels of underpricing than large capitalized firms. The increase in capitalization seems to be associated with a decrease in the level of underpricing; indeed, firms with a capitalization over €1 billion have the lowest average underpricing, equal to 3.35%.

Table VI – "Money left on the table", by listing year				
Year	IPOs	Listed shares	Money left on the table	
			Total amount (million €)	Mean amount (million €)
2001	18	904,017,167	96.00	5.33
2002	6	262,050,000	-35.89	-5.98
2003	4	352,067,500	-3.85	-0.96
2004	8	1,055,524,839	75.99	9.50
2005	15	505,169,064	145.50	9.70
2006	21	924,887,594	4.12	0.20
2007	29	751,608,531	140.94	4.86
2008	6	86,989,952	5.40	0.90
2009	5	41,050,703	17.80	3.56
2010	8	1,495,970,044	-4.06	-0.51
2011	5	51,298,485	37.00	7.40
2012	4	26,674,481	79.77	19.94
Total	129	6,457,308,360	558.73	4.33

The total amount of "money left on the table" in the period is equal to €558.73 million, with an average of €53.94 million per single IPO. In 2005 and 2007 a very large amount of wealth was lost in IPOs from several companies, while in 2002, 2003 and 2010 no money was left on the table overall and companies "gained" from the negative initial return of certain IPOs in their first day of trading.

4.02   The aftermarket performance

The average performance after 30 days is equal to 5.07% and 5.46%, in terms of raw and adjusted return respectively. The number of IPOs with a negative post-listing performance accounts for more than 40% of the sample. The number of extreme values increase considerably compared to the underpricing on the first day of trading. This is also evident looking at the values of standard deviation in Panel B, which resumes the main statistics of the sample: the standard deviation of the raw and adjusted performance is 0.229 and 0.225 respectively.

Table VII – Simple and adjusted underpricing after 30 days							
Year	IPOs	Raw underpricing (%)			Adjusted underpricing (%)		
		Mean	Positive	Negative	Mean	Positive	Negative
2001	18	-8.68%	4	14	-6.37%	8	10
2002	6	-2.63%	1	5	2.25%	3	3
2003	4	-6.31%	0	4	-10.39%	0	4
2004	8	1.14%	5	3	2.19%	3	5
2005	15	21.60%	11	4	19.10%	11	4
2006	21	7.80%	16	5	6.86%	14	7
2007	29	3.79%	16	13	5.46%	19	10
2008	6	4.15%	3	3	6.86%	5	1
2009	5	33.66%	5	0	34.46%	5	0
2010	8	-7.63%	1	7	-9.51%	2	6
2011	5	10.24%	2	3	10.94%	4	1
2012	4	15.32%	3	1	12.23%	2	2
Total	129	5.07%	67	62	5.46%	76	53

Table VIII – Distribution and statistics of underpricing on the 30th day of IPO listing				
Panel A				
Distribution	RIR		MAIR	
	No. IPOs	%	No. IPOs	%
Less than 0	62	48.06%	56	43.41%
0-4.99	15	11.63%	17	13.18%
5-9.99	15	11.63%	18	13.95%
10-19.99	18	13.95%	19	14.73%
20-29.99	7	5.43%	8	6.20%
30-49.99	9	6.98%	7	5.43%
Over 50	3	2.33%	4	3.10%
Total	62		56	
Panel B				
Descriptive Statistics	RIR		MAIR	
Mean (%)	5.07%		5.46%	
Standard Deviation	0.229		0.225	
1st Quartile (%)	-5.37%		-4.75%	
Median (%)	0.24%		1.19%	
3rd Quartile (%)	12.18%		12.94%	
Minimum (%)	-64.85%		-64.75%	
Maximum (%)	145.29%		141.22%	
Skew-ness	2.294		2.046	
Kurtosis	15.471		13.703	

In light of these considerations it is logical to expect that some IPOs that are initially underpriced have negative cumulated returns after 30 days, and vice versa. In fact, 25 IPOs in the sample (19.37%) register a negative post-listing performance despite their first day positive return. This occurrence can be related to underwriters'

temporary support in the initial period of trading. They usually sell shares that they do not own before the IPO and then cover their position by purchasing shares from the market if the price starts to fall. Conversely, if the IPO is a success with a price leap, underwriters exercise the greenshoe option that allows them to buy shares from the issuer at the offer price.

Figure 02: Performance of IPOs on the listing day and on the 30th day after listing
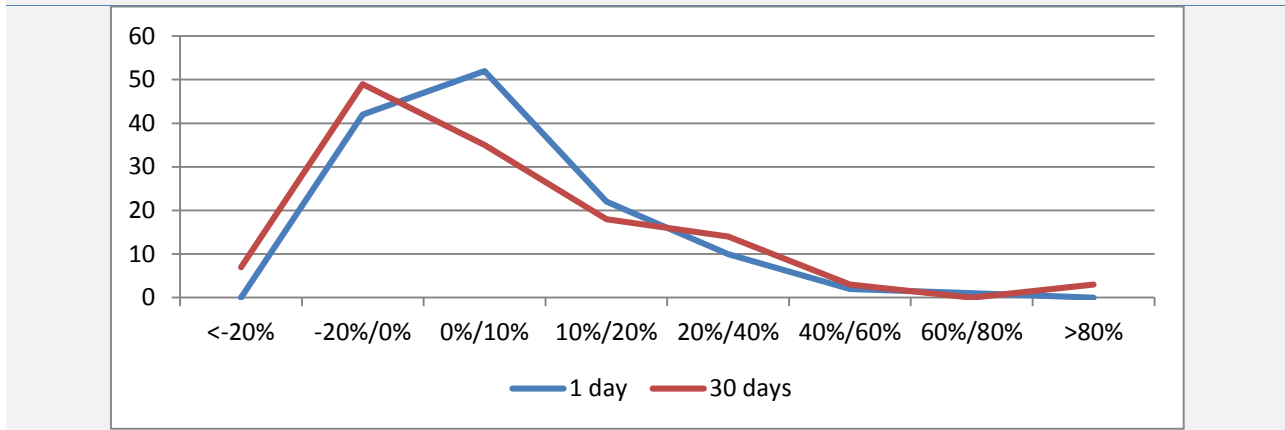
4.03   Results of the regression analysis

In Model 1, BETA, DM, and GS variables have coefficients 0.082, 0.015, 0.034, which are statistically significant at 10%, 1% and 10% level respectively

Explanatory Variables	MAIR as dependent variable		
	Model 1	Model 2	Model 3
constant	0.0004	-0.027	-0.119
	0.01 (0.996)	-0.38 (0.702)	-1.94 (0.054)*
SIZE	-0.007	-0.014	-0.018
	-0.16 (0.875)	-2.12 (0.036)**	-2.85 (0.005)***
AGE	-0.006	-0.008	
	-0.93 (0.354)	-1.31 (0.191)	
RO	0.160	0.206	0.201
	1.21 (0.23)	3.05 (0.003)***	2.95 (0.004)***
LGP	-0.003		
	-0.07 (0.942)		
FIN	-0.025	-0.022	
	-1.24 (0.217)	-1.08 (0.283)	
LB	-0.026		
	1.16 (0.248)		
BETA	0.082	0.080	0.080
	1.82 (0.072)*	1.89 (0.061)*	1.9 (0.06)*
MC	-0.00002	-0.00001	
	-0.91 (0.363)	-0.89 (0.374)	
UR	-0.014	-0.014	
	-0.83 (0.409)	-0.87 (0.385)	
DM	0.015	0.014	0.015
	4.69 (0.000)***	4.41 (0.000)***	4.51 (0.000)***
HOT	-0.024		
	-1.49 (0.139)		
TLAG	-0.012	-0.013	
	-1.53 (0.129)	-1.63 (0.105)	
CR	0.050	0.066	0.085
	1.49 (0.139)	1.9 (0.06)*	3.05 (0.003)***
GS	0.034	0.036	0.026
	1.81 (0.073)*	1.92 (0.058)*	1.56 (0.122)

Table IX – Regression results with MAIR as dependent variable (N=129)

F value	6.94***	8.25***	10.71***
R - squared	0.4976	0.4887	0.4561
Adj - R squared	0.4356	0.4406	0.4294
T-statistics of regression coefficients are reported below the coefficients. Numbers in parentheses are the p-value, asterisks ***,**. and * indicate Significance at the 1%, 5%, and 10% level respectively.			

These results confirm that the risk of a firm is positively related to IPO underpricing. The systematic risk, as measured by the beta, should be intended as a good proxy of ex-ante uncertainty and it is a useful indicator of the degree of underpricing. Indeed, risky companies with high stock betas are exposed to higher underpricing; this is in line with previous studies in the US market and in the Arabian Gulf Countries (Uddin and Raj, 2012). Then, the oversubscription rate of IPOs is certainly the most important determinant in our model. This is consistent with Rock (1986). The variable is supposed to reflect investors' appetite for an IPO; thus, it is not surprising that IPOs with high demand have a positive and significant relationship with underpricing level. Furthermore, the exercise of the greenshoe option, introduced in this study as explanatory variable, seems to affect the initial level of underpricing in a significant way. The evidence depicts that IPOs of companies exercising the option are associated with higher initial performance.

Table X – Pearson Correlation matrix													
Variables	SIZE	AGE	RO	LGP	FIN	LB	BETA	MC	UR	DM	HOT	TLAG	CR	GS
SIZE	1													
AGE	0.1295	1												
RO	-0.1234	0.1351	1											
LGP	0.9557	0.0826	-0.3829	1										
FIN	-0.1304	-0.2352	-0.1885	-0.0831	1									
LB	0.6732	0.1923	-0.3125	0.718	-0.1431	1								
BETA	0.2722	0.2222	-0.0573	0.2642	-0.1013	0.0995	1							
MC	-0.0056	-0.0173	0.1404	-0.0293	-0.1147	-0.0444	-0.1829	1						
UR	0.204	-0.001	-0.0645	0.2275	-0.0342	0.1874	0.0382	0.0896	1					
DM	0.2796	0.1596	0.0517	0.2628	0.0164	0.2334	0.2454	-0.1616	0.1501	1				
HOT	0.282	0.1795	-0.2082	0.3305	-0.0866	0.1949	0.3797	-0.1496	0.0307	0.3599	1			
TLAG	0.422	0.1682	-0.0841	0.4344	-0.1816	0.3941	0.184	0.1216	0.0846	0.0303	0.2442	1		
CR	-0.4525	-0.2401	0.1981	-0.4947	0.1832	-0.3819	-0.2371	0.0922	-0.0575	-0.2374	-0.6305	-0.5605	1	
GS	0.3593	0.2084	0.0003	0.3588	-0.2089	0.2304	0.1971	-0.0505	0.258	0.3582	0.3025	0.3536	-0.3727	1

Pearson correlation analysis among the variables is carried out to test if multicollinarity issues can affect the results of Model 1. Results indicate that SIZE is highly correlated both to LGP and LB, coefficients of 0.9557 and 0.6732 respectively. Moreover the coefficient of correlation between HOT and CRISIS is -0.6305. All other correlation coefficients are less than 0.5. Model 2 presents the results of a regression where multicollinarity problems are removed. All the significant variables of Model 1 remain significant here, and additionally SIZE, RO and CR appear to be significant. The estimated coefficient for SIZE is negative and significant at 5% level, indicating that large firms are associated with lower underpricing levels. Moreover, the statistical significance emerging on the control variable RO, demonstrates the signalling hypothesis of IPO underpricing. The most surprising result is the positive coefficient of the variable CR, which is significant at 10% level. This could explain that companies "hungry for cash", considering the liquidity crunch of the crisis, must price their issues with considerably discounts if they want the IPO to be successful. Thus, the variable is significant enough to signal the positive impact on the overall IPO underpricing level.

Model 3 includes only the independent variables that are significant to explain the IPO underpricing of Model 2. Results indicate that size of the firm, aftermarket risk, demand from investors, measured by the oversubscription rate, financial crisis and percentage of retained equity by existing shareholders are the key explanatory factors of underpricing levels. These results support most of the existing IPO literature. Finally, Table XI reports the results for the stepwise regression analysis using the return after 30 days as dependent variable. The main used explanatory variables are not as good as in the first analysis, but help to predict at least the 18.47% of variability in the final model. CR and GS are statistically significant at 5% level and affect positively the performance. DM results the only strong explanatory variable. This finding suggests that a higher IPO demand determines also higher performance after the listing of the firm.

Table XI – Regression results with $MAIR_{30}$ as dependent variable (N=129)			
Explanatory Variables	MAIR as dependent variable		
	Model 1	Model 2	Model 3
constant	-0.260	-0.195	-0.090
	-1.47 (0.143)	-1.16 (0.25)	-3.1 (0.002)***
SIZE	-0.114	0.004	
	-1.82 (0.072)*	0.23 (0.82)	
AGE	-0.010	-0.017	
	-0.61 (0.543)	-1.12 (0.265)	
RO	0.498	0.162	
	2.08 (0.04)**	1.1 (0.275)	
LGP	0.128		
	2.03 (0.045)**		
FIN	-0.035	-0.031	
	-0.81 (0.422)	-0.71 (0.48)	
LB	-0.067		
	-1.08 (0.284)		
BETA	0.168	0.161	
	1.33 (0.186)	1.43 (0.156)	
MC	-0.00003	-0.00002	
	-0.67 (0.503)	-0.45 (0.655)	
UR	-0.023	-0.018	
	-0.72 (0.475)	-0.53 (0.596)	
DM	0.016	0.015	0.018
	2.81 (0.006)***	2.62 (0.01)***	3.93 (0.000)***
HOT	-0.053		
	-1.51 (0.134)		
TLAG	-0.009	-0.008	
	-0.59 (0.559)	-0.56 (0.577)	
CR	0.091	0.115	0.120
	1.31 (0.191)	1.66 (0.099)*	2.4 (0.018)**
GS	0.071	0.082	0.084
	1.79 (0.077)*	2.1 (0.038)**	2.44 (0.016)**
F-value	6.94***	3.86***	4.29***
R - squared	0.4976	0.2813	0.2535
Adj - R squared	0.4356	0.193	0.1833

T-statistics of regression coefficients are reported below the coefficients. Numbers in parentheses are the p-value, asterisks ***,**. and * indicate significance at the 1%, 5%, and 10% level respectively.

5.0   Conclusions and policy implications

The underpricing phenomenon has been the subject of considerable research over the last decades. This work makes a contribution to the existing IPO literature by analysing a dataset of recent IPOs in Italy. Our findings in the 2001-2012 periods add new empirical evidence to the hypothesis that underpricing is gradually reducing over time as a consequence of the adoption of more efficient bookbuilding procedures (Cassia et al., 2003). We also find that some variables significantly affect the IPO underpricing level: firm size, firm' risk as measured by the beta, demand of the issue, percentage of retained shares, and the listing during the recent financial crisis period. Size, demand multiple and retained ownership are all possible proxies for ex-ante uncertainty and give a signal to the market that is then reflected on the first-day return. The beta is relevant to explain the firm's inherent risk that is reflected on investors demand for higher returns while the financial crisis considerably affects the initial performance probably due to the speculative opportunity offered by new listings and the high price discounts demanded by investors.

As far as the aftermarket performance is concerned, we find that IPOs tend to be more overpriced after the listing than in the first day of trading. We relate this result to temporary actions of price support by underwriters. However, aftermarket performance seems to be affected to some extent by the exercise of the greenshoe option, the market demand and the financial crisis period. Our result suggest some policy implications: First, our results can be relevant for the stock exchange regulators and the stock exchange management company, in order to assess the efficiency of the Italian equity market and address the possible areas of improvement in the different segments of the market. In particular, the authorities and the stock exchange managers may try to enhance the efficiency of the market segments devoted to small and medium enterprises (AIM Italia still reports a high underpricing level). Second, at a micro level company managers can benefit from the results of our work in order to optimize those factors that impact on the post-IPO performances when considering listing on the Italian stock exchange.

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