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Would you buy a car from this man? The relationship between underpricing and type of seller in Italian IPOs

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- ABSTRACT -

This paper provides evidence of a significant relationship between the level of underpricing of Italian IPOs over the period 1999-2008 and the type of shareholder backing the company going public. While family-backed IPOs are significantly underpriced (+11.6%), IPOs backed by private equity funds, venture capitalists, investment banks and management buyout specialists present, on average, a negative or zero initial return (-0.7%). The difference between the two groups is robust even after controlling for the size of the company, the uncertainty around the issue and the market momentum. Evidence is also provided that families could *intentionally* underprice the IPO share. It is hypothesized that private equity shareholders use the IPO to liquidate their investment, and hence apply the highest possible price to maximise IPO proceeds, while families could underprice for maximising long-run proceeds, including private benefits of control. Additional evidence on Hanley (1993) «partial adjustment theory» is also provided.

1. Introduction

1.1 Purpose and structure of the paper

Purpose of this paper is studying the determinants of underpricing of Italian initial public offerings (IPOs) in the period 1999-2008, and in particular analyzing if, depending on the type of shareholders backing the IPO, different pricing policies could be observed which lead to different levels of initial return.

Referring to the used cars market, made popular in the economics field by Akerlof (1970), what is the relationship between the price of the car sold and the identity of the seller? *Would you buy a car from this man?* This paper tries to answer this question looking not at automobiles, but at a particular kind of asset: the share of a company never traded before on the stock market.

Original contributions to the existing literature are the following: (a) the study hypothesizes and provides evidence of a relationship between ownership, type of shareholding and underpricing. As for Italian IPOs, either studies analyze underpricing without looking at the ownership structure (see Table 1) or analyze IPO companies' ownership structure without looking at the initial return (Rigamonti (2007)). This paper, for the first time, connects the two directions of research; (b) it extends the study of underpricing in Italy to a period (1999-2008) for which only one study (Boreiko and Lombardo (2008)) is available; (c) by introducing a new measure of underpricing (*midpoint* underpricing, see 1.3 and 5.3) provides additional evidence on the function played by price revision in IPOs and on Hanley (1993) «partial adjustment theory».¹

Structure of the paper is the following: the rest of section 1 summarizes the IPO process and the pricing mechanism; section 2 reviews some evidence and the main theories on IPO underpricing; section 3 explains the peculiarities of the Italian corporate governance system, and formulates hypothesis of a relationship between underpricing and type of shareholding; section 4 provides details about sample selection and methodology, while section 5 reports some descriptive statistics. Section 6 presents the results of the regression analysis of underpricing and price revision. Conclusive comments can be found in section 7.

¹ A review of the “partial adjustment theory” can be found in 2.2.2.

1.2 The IPO process

Through an initial public offering (IPO) a company diffuses its shares among the public before being listed on the stock exchange.

The IPO process could last more than three months. In Italy, after the IPO plan is agreed between the company and the syndicate of underwriters, the IPO company must be admitted by the national securities market regulator (CONSOB). A prospectus (offering circular) is then filed with the same commissioner and with Borsa Italiana, the institution ruling the Italian stock exchange. The prospectus includes information regarding the characteristics of the offer, about the ownership structure and selected financial information of the IPO company.

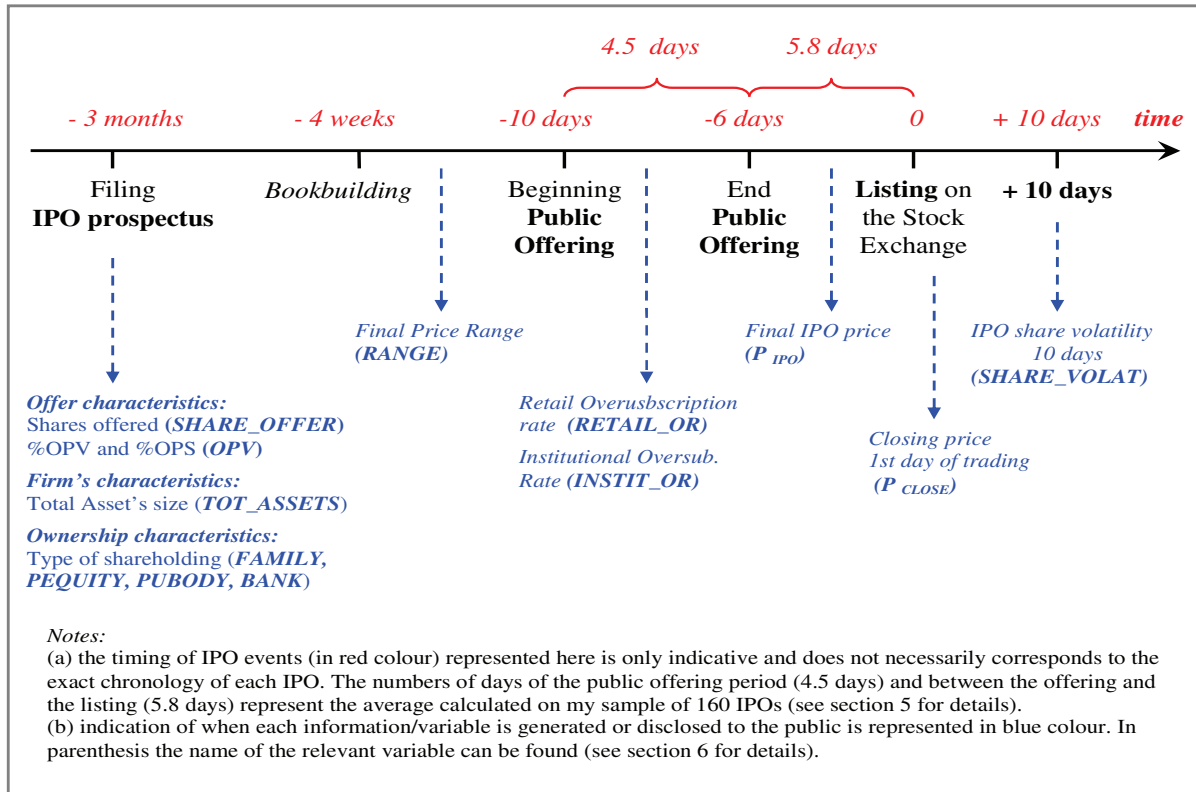
In the case of *open price* IPOs, four or five weeks before the listing a period called *bookbuilding* starts in which the IPO company invites selected institutional investors to submit their indications of demand. Generally these investors can revise or even cancel the bids, but the indications gathered allow the underwriter to better trace the demand curve and to fix the final price range, within which the final offer price (IPO price) must be defined.

The proper offering period could then begin (on average, it lasts 4-5 days). Shares offered could be sold by existing shareholders (OPV, public offer of selling) or newly issued (OPS, public offer of subscription), or could be a mix between the two cases (OPVS). The global offering is also usually split between an offering reserved to institutional investors (usually 75% of the shares offered) and another reserved to private/retail investors.

After 2-3 days since the end of the offering period, the final offer price (IPO price) is communicated to the public. Two or three days more, and the IPO shares are admitted to the listing. With the first day of trading on the stock exchange, the IPO process finally concludes.

Figure 1 below represents the chronology of the process, with indication of when each information/variable is generated or disclosed to the public.

Figure 1 – The IPO Process



1.3 The pricing mechanism

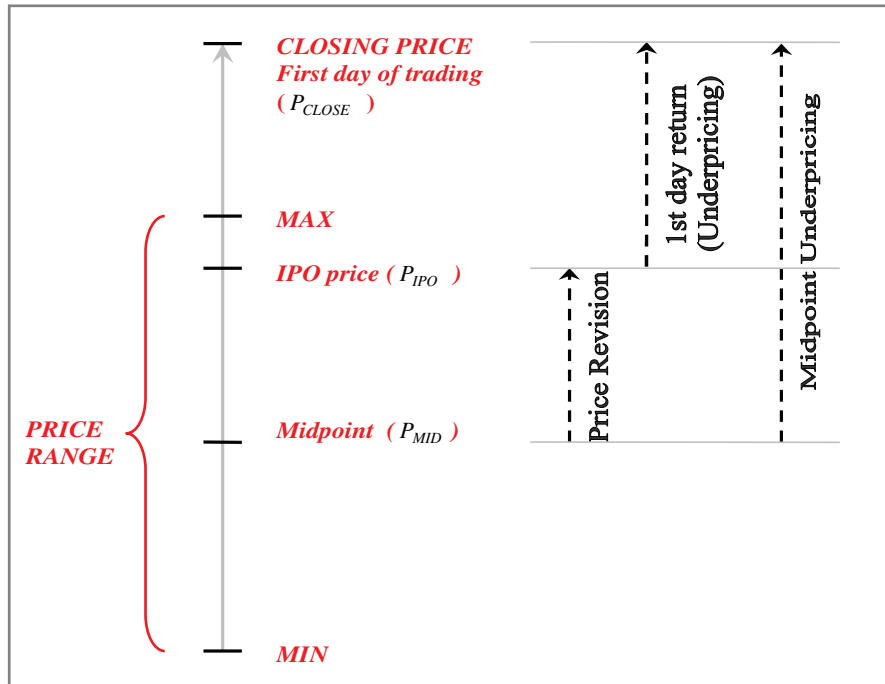
On the other side Figure 2 focuses on the pricing process. The price range (*RANGE*), determined by a minimum price (*MIN*) and a maximum price (*MAX*), is indicated in the IPO prospectus. After the offering, the final offer price (IPO price, P_{IPO}) is fixed within the range,² while the closing price (P_{CLOSE}) will be available only at the end of the first day of trading.

The midpoint of the price range could be interpreted as the expected value of the IPO company (Hanley (1993): 233). It seems plausible that, if no price revision occurred, the issuer would sell the company at the average price of the range. On the contrary the closing price of the first day of trading could be considered, in a IASB sense, the ex post «fair value» of the company.³ This paper analyzes the difference between the two values, and how this difference is split between its two components: (a) the price revision; (b) the return on the first day of trading, i.e. underpricing itself.

² In truth, according to the Italian legislation, a company could decide to fix the final offer price below the minimum price.

³ The International Accounting Standards Board (IASB) defines fair value as the «amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction» (IAS 32).

Figure 2 – The pricing mechanism



As in Hanley (1993), the price revision (*REVISION*) is here defined as the relative difference between the midpoint of the price range (P_{MID}) and the final IPO price (P_{IPO}), and thus is calculated, for each i IPO, as:

$$REVISION_i = \frac{(P_{IPOi} - P_{MIDi})}{P_{MIDi}} * 100 = \frac{\left[P_{IPOi} - \left(\frac{MAX_i + MIN_i}{2} \right) \right]}{\left(\frac{MAX_i + MIN_i}{2} \right)} * 100$$

while, as in Hanley (1993), the % width of the price range (*RANGE*) is calculated as:

$$RANGE_i = \left(\frac{MAX_i - MIN_i}{MIN_i} \right) * 100$$

The price revision is deeply analyzed in 5.3 and in 6.2, while details about the price range are in 2.2.1 and 6.1.

On the other side, the initial return is calculated as the relative difference between the closing price of the IPO share on the first day of trading and the IPO price. If this difference is positive, it is referred to as *underpricing*, otherwise it is called *overpricing*. Sometimes, instead of the first day, the fifth or the tenth day of trading is taken (e.g. Brennan and Franks (1997)). This paper focuses on the first day return. More precisely, for each IPO of the sample, two measures of initial returns are calculated:

(a) *simple* underpricing, calculated as in Beatty and Ritter (1986) and Megginson and Weiss (1991) as:

$$UP_i = \frac{(P_{CLOSEi} - P_{IPOi})}{P_{IPOi}} * 100$$

The closing price (P_{CLOSE}) is the last recorded price on the first day of trading. It is not adjusted for dividends and splits, otherwise a direct comparison with the IPO price could not be possible.

(b) *adjusted* underpricing. It is corrected by taking into account the return on the market index between the last day of the offering period and the listing date, as in Brennan and Franks (1997), Cassia et al (2004). It is calculated as:

$$ADJ_UP_i = \left[\frac{(P_{CLOSEi} - P_{IPOi})}{P_{IPOi}} - \frac{(P_{CLOSEm} - P_{0m})}{P_{0m}} \right] * 100$$

the *MIBTEL*, official market index of Borsa Italiana is here adopted. Hence $P_{CLOSEm} = MIBTEL$ closing price, 1st day of exchange of the IPO share; $P_{0m} = MIBTEL$ closing price on the last day of the offering period.

Finally, referring to what said above and to Figure 2, I call *midpoint underpricing* the total difference between the expected value (midpoint of the range) and the market value of the IPO company. And I calculate it as:

$$MID_UP_i = \left(\frac{P_{CLOSEi} - P_{MIDI}}{P_{MIDI}} \right) * 100 = \left[\frac{P_{CLOSEi} - \left(\frac{MAX_i + MIN_i}{2} \right)}{\left(\frac{MAX_i + MIN_i}{2} \right)} \right] * 100$$

2. Underpricing: theory and evidence

2.1 Underpricing: the evidence

A vast empirical evidence exists which shows that, on average, on the first day of trading, using the IPO price as a base, companies which go public register a significant positive stock return. Underpricing is a regularity on almost all the stock exchanges (for a review, Jenkinson and Ljungqvist (2001): 37-40). As for Italy, some results of the studies analyzing IPOs initial return are summarized in Table 1.

Table 1: IPO Underpricing in Italy. Previous studies

Study	Sample period	Sample size	Simple Underpricing	Adj. Underpricing	% Underpricing	% Overpricing
Arosio et al (2000)	1985-2000	164	23.9%	21.0%*	73.2%	26.8%
De Lorenzo and Fabrizio (2001)	1988-1998	77	<i>na</i>	11.1%	<i>na</i>	<i>na</i>
Cassia et al (2004)	1985-2001	182	21.9%	19.3%**	69.2%	30.8%
Boreiko and Lombardo (2008)	1999-2007	161	12.8%	12.9%	63.3%	36.7%

* considering only open price IPOs, adjusted underpricing is 14.5% (8.1% excluding Finmatica IPO).

** considering only open price IPOs, adjusted underpricing is 12.5% (7.2% excluding Finmatica IPO).

Due to underpricing, an investor who buys an IPO share at the public offering and sells it at the end of the first day of trading could realize, on average, an abnormal profit; on the other hand, the seller in an IPO would suffer a loss in terms of 'money left on the table' (the «costs of going public» as defined by Ritter (1987)). This has often been interpreted as an anomaly (e.g. Ibbotson (1975)), reason why several hypothesis have been formulated to explain it. They are reviewed in next paragraphs.

2.2 Underpricing: the theory

2.2.1 *Theories based on asymmetry information and ex-ante uncertainty*

All these theories draw on Akerlof (1970) 'lemons' problem (applied to used cars market): the asymmetry of information could lead, in extreme cases, to market breakdown. Rock (1986) hypothesizes that issuers intentionally underprice IPO shares in an environment in which allocation of shares is rationed, and in which some investors are informed, and some are not, so as to convince the uninformed to purchase the IPO shares and not to retire from the market.

A first implication of the above theory is that ‘good’ issuers have the incentive to reduce the asymmetry of information so as to reduce the underpricing costs. They could signal their good quality by hiring underwriters with a good reputation (Habib and Ljungqvist (2001)), or relying on venture capitalists as certifiers (Megginson and Weiss (1991)). But empirical evidence on venture capital certification role is weak (Barry et al (1990), Lin and Smith (1998)).

A second implication is that, as noted by Ritter (1984: 220) and Rock (1986: 187), underpricing could be interpreted as a compensation to investors for the costs of becoming informed. Intuitively, information costs are higher the higher the uncertainty surrounding the IPO company; thus IPO underpricing should be higher the higher the ex ante uncertainty about an issue.

However, it is difficult to find satisfactory proxies for ex ante uncertainty (Jenkinson and Ljungqvist (2001): 70, for a review). The age of the IPO company or the size of the firm in terms of sales or total assets can be used (Cassia et al (2004), Ritter (1984)): the younger and the smaller a company, the higher the degree of uncertainty and hence the higher the level of underpricing. Hanley (1993: 239) proxies the ex ante uncertainty with the width of the price range. More questionable the adoption of the IPO share daily volatility in the aftermarket (Ritter (1987), Prabhala and Puri (1998); Cassia et al (2004). See 6.1 for details).

2.2.2 «Partial adjustment» theories

Usually IPOs can be grouped according to three methods: auction-type IPOs, fixed-price IPOs and open price (*bookbuilding*) IPOs. None of the IPOs in my sample are auctions or fixed-price type, hence they are not discussed here. Instead, most of Italian IPOs since 1995, and all the IPOs of my sample, adopt an open price methodology.

As anticipated in 1.2, since the information gathered during the bookbuilding allows the issuer to better trace the demand curve, it could be hypothesized that IPOs with bookbuilding could reduce the information asymmetry and hence the level of underpricing (Benveniste and Spindt (1989)). Empirical support in this sense is provided, as for Italy, by Cassia et al (2004) and Arosio et al (2000).

However, as noted by Hanley (1993), the revision from the initial price range does not embody the whole underpricing: a residual underpricing, in terms of first trading day return, is still observed. Why the issuer «only partially adjust the price»? (Hanley (1993): 232) Benveniste and Spindt (1989) hypothesize that a residual (positive) underpricing will act as a compensation to induce investors to disclose their private information during the bookbuilding. Otherwise, if the information were used to their disadvantage (e.g. by increasing the offer price) they would not have the incentive to reveal it.

Hanley (1993) also shows that the price revision could act as a signal: the higher the revision from the midpoint of the range, the higher the underpricing on the first day of trading. This is confirmed, in Italy, by Cassia et al (2004)).

2.2.3 *Theories based on the market momentum*

During bull markets, investors expect higher returns and hence are willing to pay higher prices for IPO shares (Lowry and Schwert (2002)): thus a positive correlation between underpricing and the market return pre IPO should be observed. Evidence in this sense is vast (in Italy: Cassia et al (2004), Arosio et al (2000); Boreiko and Lombardo (2008)). Pagano et al (1998) show that the market sentiment (in terms of sector Price to Book) is considered by the issuer also in *timing* the IPO, so as to exploit possible mispricing.

2.2.4 *Theories based on signalling hypothesis*

Allen and Faulhaber (1989) and Welch (1989) hypothesize that underpricing could be intentionally created by the issuer so as to signal to the market the good quality of the firm, in order to be able to ask more favourable prices in successive settlements, such as in seasoned equity offerings (so-called «Leave a good taste hypothesis»). But empirical evidence in this sense is mixed (e.g. McGuinness (1992), Garfinkel (1993)).

2.2.5 *Agency theories*

For the shareholders of an IPO company, one of the most significant disadvantages of going public is the fear of losing control (Roell (1996): 1077). A controlling shareholder deciding to quote a company could adopt several options in order to avoid the loss of control: (a) offering only a minority of the share capital, so as to preserve the majority of voting rights; (b) issuing non voting shares or shares with restricted voting power (i.e. adopting a *dual class* structure); (c) adopting special arrangements such as shareholders' agreements (Bianchi et al (2003): 160, for a description); (d) using pyramidal structures or cross shareholdings so as to maximise the control with the minimum commitment in terms of cash flow rights (Arye Bebhuck et al (2000), for a review); (e) using specific pricing or allocation policies at the IPO which avoid the formation of large and active monitorers.

As for the last option, Brennan and Franks (1997) find empirical evidence (in UK) that the issuer could intentionally underprice an IPO to generate a higher oversubscription of the offer and hence, if specific rationing is applied in the allocation of shares, to create a more dispersed shareholding. Underpricing would allow the controlling shareholder to discriminate against large

applicants so as to avoid the formation of large and active shareholders and to reduce the monitoring of outside investors.

Smart and Zutter (2003) indirectly support the above hypothesis by showing that firms issuing dual class shares present lower levels of underpricing (if other devices are used to preserve control, underpricing is not needed).

Zingales (1995) and Mello and Parsons (1998) hypothesize that shareholders would maximise private benefits of control by selling at the IPO only a minority stake of the company and eventually selling the controlling block through a direct bargaining after the listing.

3. Ownership and control in Italian companies

To strengthen the hypothesis of a relationship between underpricing and type of shareholding, the peculiarities of the Italian context in terms of ownership and control must be analyzed.

3.1 Ownership and private benefits of control

The Italian corporate governance system differs from the Anglo-Saxon system: a limited role is played by public companies. But also from the ‘continental’ one: a limited role is played by banks in non financial companies (Bianco (2001):130). On the contrary, founding families, the State and industrial groups are in a crucial position (Bianchi et al (2003)).

Italy represents also an ideal setting for those interested in private benefits of control (PBC). The value of PBC, enjoyed exclusively by controlling shareholders, stems «from social prestige of running a listed firm, access to information that could be used outside the firm, power of deciding how to allocate [...] resources and people within the firm, and the opportunity to extract pecuniary benefits» (Holmen and Hogfeldt (2004): 325).

As shown by Faccio and Lang (2002), the average ratio of cash flow to voting rights in Italian listed companies is 0.743, the lowest among western countries (excluding Switzerland). Such a high separation between ownership and control could be explained only by the existence of significant PBC, since the incentive to hold voting shares in excess of cash flow rights is directly proportionate to the value attached to control rights. Empirical evidence supports this hypothesis: both Nenova (2003) and Dyck and Zingales (2004) prove that Italy has the highest level of PBC among industrialized countries. In addition, Italy is also ranked by La Porta et al (1998) among the countries with the poorest minority investors’ protection, hence confirming how more valuable is owning a majority stake in a company compared to a minority share.

3.2 Dynamics of control in IPO companies

Given the existence of such private benefits of control, it could be expected that controlling shareholders would adopt devices at the IPO in order to retain the control of the company.

Rigamonti (2007) provides empirical evidence in this sense. She shows that, between 1985 and 2005, Italian companies offered at the IPO, on average, only 30.5% of the share capital post

listing; and in the 10 years after the listing, only 22.7% of the IPO companies experienced a change in command. Italian shareholders are evidently not keen in leaving the control of the company.

But these patterns are not the same across the companies: the share offered as a fraction of the capital is much lower in family-backed IPOs (28.5%) than in venture capital-backed firms⁴ (43.4%, which becomes 58% looking at the share capital ante IPO). In addition, if those offered are existing shares, in 64% of the cases is the private equity investor who sells; and if only 18.2% of family backed IPOs experience a change in ownership after the listing, in the case of venture capital backed IPOs the percentage increases to 60%. Rigamonti (2007: 22) concludes that «family-controlled firms value control most and are less inclined to give up the majority of votes» (Rigamonti (2007): 1) while «the flotation is clearly used by venture capitalists as an exit option, though partial» (Rigamonti (2007): 22). Indeed, the use of IPOs by investment funds to liquidate their position seems common also in other countries such as the USA (Barry et al (1990): 450) and Sweden (Holmén and Hogfeldt (2004: 327)).

In this sense it has to be considered that the Italian law limits the life time of investment funds (DM 24/5/1999, no. 228, art.6), and on average private equity are dismissed after 10 years, hence being less interested in long run investments. Also, they often change control: 22.5% of the private equity-backed IPOs in my sample⁵ experience a delisting due to a public offer within 6 years since the IPO, while only 9.4% of family backed IPO companies are retired from the stock exchange.

Emblematic is the case of Ferretti Yachts: listed in 2000 by a private equity fund (Schroeder), it is then bidded and delisted in 2003 by another private equity fund (Permira). After a first try of IPO aborted in 2006, Ferretti will be listed again on the Italian stock exchange in the second half of 2008.

3.3 *Control, type of shareholding and underpricing*

The empirical evidence of previous paragraphs shows that IPOs are used by private equity as (partial) exit options, while families and founders tend to retain the control at and after the IPO.

Can these different dynamics of control lead to different pricing policies at the listing? Is it possible to observe a relationship between the level of underpricing and the type of shareholders backing the IPO?

⁴ In Rigamonti (2007) venture capitalist is «either a venture capital fund or a merchant bank acting as a private equity investor». The classification of Rigamonti is slightly different from what will be adopted here (see 4.3).

⁵ See section 4 for details about sample selection.

It seems plausible that if private equity funds use the IPO for liquidating their investment in the company, then they will probably try to maximize the proceeds at the IPO by applying the highest possible price: hence less likely IPO shares would be underpriced.

What about families or founders? If a shareholder aims at keeping the control over the IPO company, then he could be more interested in maximising the proceeds on the long run rather than those of the listing. These include also private benefits of control as long as the company stays under control. If underpricing the share at the IPO could help retaining the control in the post-IPO period, and thus help maximising the proceeds in the long run, i.e. if the cost of underpricing is lower than the marginal benefit of underpricing after the listing, then shares will be underpriced at the IPO.

To understand how underpricing could help the exploitation of private benefits of control in the long run, we can rely on some of the theories of section 2: (a) as prospected by Brennan and Franks (1997), shares could be underpriced so as to generate oversubscription and then, if rationing is adopted, to discriminate against large applicants (see 2.2.5); (b) underpricing could be used for signalling the good quality of the firm and hence for asking for more favourable prices in successive offerings (Allen and Faulhaber (1989) and Welch (1989), see 2.2.4); (c) finally, by underpricing, existing shareholders would create less reputational problems to banks which act as underwriters of the IPO, thus keeping a better relationship with them, which could be used for future equity or debt arrangements.

Issuers would resort to underpricing also because, in Italy, the use of dual class shares is not widespread among listed companies (Rigamonti (2007): 24; Bianchi et al (2003): 160).

As a result, if these hypothesis hold, the following patterns should be observed:

- (a) higher levels of underpricing for family-backed IPOs than for private equity-backed IPOs;
- (b) smaller amount of shares offered, in terms of fraction of the share-capital post IPO, for family-backed IPOs than for private equity-backed IPOs, due to the higher reluctance of the first group to give up the control;
- (c) of the total shares offered, family-backed IPO companies would issue a higher fraction of newly issued shares (OPS shares) than private equity-backed companies: while the latter tend to liquidate the investment mostly by selling their existing shares (OPV shares), families could use the IPO also for raising new equity.⁶
- (d) a negative correlation between the level of underpricing and the amount of the share capital offered to the market, because higher dilution would signal the use of IPOs as exit options;

⁶ To be reminded that OPS shares + OPV shares = Total IPO shares offered.

(f) a negative correlation between the level of underpricing and the fraction of OPV shares, since higher selling would signal the use of IPOs to liquidate the initial investment.

If these hypotheses hold, the correlation between the first day return and the type of shareholding should be robust even after controlling for other variables which, according to the theories reviewed in 2.2, could affect the level of underpricing, such as firm size, ex ante uncertainty or market momentum.

While in the case of family or private equity-backed IPOs hypotheses about the expected level of underpricing can be formulated, it is difficult to predict the objectives of banks and public bodies in pricing IPOs.

As for public bodies (for a review: Jenkinson and Ljungqvist (2001): 170), some authors hypothesize lower levels of underpricing due to lower cash flow risks (Huang and Levich (1998)), while other hypothesize that the State, during privatizations, could intentionally underprice so as to generate higher demand and to develop a base of small investors (Ibbotson et al (1994)).

As for banks, a distinction if the bank is a shareholder of a non-financial or a financial IPO company has to be made: only in July 2008 banks have been allowed by the Italian law, according to EU banking legislation, to hold significant stakes in non-financial companies (Delibera CICR 29/07/2008, n.276). Thus «it is still too soon to observe more active involvement» (Bianchi et al (2003): 164). Hence it can be hypothesized that, as shareholders of non-financial IPO firms, banks would act as short term private equity investors, with the same implications in terms of pricing policy and initial return. On the other side a more active role is assumed when they are shareholders of other financial institutions, hence the two cases are treated separately (see 4.3). Most of the IPOs of financial companies backed by banks represent the long tail of the banking privatization process started in Italy in 1992, hence it is difficult to formulate an hypothesis about the level of underpricing, also considering that the governance of Italian banks is itself an issue: «a good number is still controlled by banking ‘foundations’, non profit institutions having an hybrid nature, neither public nor private» (Bianchi et al (2003): 164).

4. Sample, data and methodology

4.1 *Sample selection*

The initial sample included 223 companies which went public on the MTA, Expandi and Nuovo Mercato segments of the Italian stock exchange (Borsa Italiana) between January 1999 and May 2008. From the initial sample, 63 companies have been excluded: (a) 10 companies listed without public offering; (b) 25 companies which were already listed on other segments of the stock exchange or on other foreign markets; (c) 16 equity carve-outs or spin-offs from other companies already listed in Italy or on other foreign markets ; (d) 8 IPOs of companies resulting from the merger or incorporation of existing companies; (e) 2 companies (Best Union and ROSSS), for which most of the data were not available; (f) 2 companies (Finmatica and Gandalf) which have been excluded, as in Cassia et al (2004) and Arosio (2000), due to the abnormal level of underpricing (respectively 440% and 121.28%, more details later).

Mergers, spin offs, equity carve outs and already listed companies are dropped, as in Cassia et al (2004), since their «fair» values should be an information already embodied in their parent company market value or already available on other markets.

The resulting sample is a group of 160 IPOs between January 1999 and March 2008.

4.2 *Data sources*

Details about the data sources used per type of data collected are provided in Table 2:

Table 2 – Data sources

Data	Data sources
<i>Returns and Ratios</i>	
IPO share returns, IPO share volatility	(a) Thomson Financial Datastream; (b) Reuters
Market index returns, volatility	(a) Thomson Financial Datastream; (b) Reuters
Market index Price to Book	(a) Thomson Financial Datastream;
<i>Characteristics of the offer</i>	
No. days public offering	(a) Borsa Italiana; (b) IPO.it (www.ipo.it);
No. shares offered *	(a) Borsa Italiana; (b) IPO.it (www.ipo.it); (c) IPO prospectuses
No. OPV/OPS shares *	(a) Borsa Italiana; (b) IPO.it (www.ipo.it); (c) IPO prospectuses
Oversubscription rates	(a) Borsa Italiana; (b) IPO.it (www.ipo.it);
<i>Characteristics of the IPO company</i>	
Age of the company	(a) IPO prospectuses;
Book value of company Total Assets	(a) IPO prospectuses; (b) Thomson Financial Datastream
<i>IPO company shareholding</i>	
Composition of shareholding	(a) IPO prospectuses; (b) IPO.it (www.ipo.it)
Type and identity of shareholders	(a) IPO prospectuses
Control chain and ultimate shareholders	(a) IPO prospectuses; (b) Consob

* No. of shares offered, OPV/OPS shares always refer to the number, as planned by the issuer and communicated in the IPO prospectus, *before* the exercise of the greenshoe option

Due to the lack of databases at Italian and European level, almost all the information about the IPO company shareholding are hand-collected from IPO prospectuses. Unfortunately only the relative share held by each shareholder pre and post IPO and not the exact number of shares could be collected, thus it can't be clearly distinguished if the dilution occurred due to the selling of existing shares or to the issue of new shares.

Whenever the share in the company was not held directly by ultimate shareholders but indirectly through other holding companies, I analyzed the whole control chain so as to identify the ultimate beneficial owner.

4.3 Methodology

As for how the three measures of underpricing (*simple*, *adjusted* and *midpoint*) are calculated, see 1.3. Here details about how companies were classified according to the type of shareholding are provided.

The 160 companies of the sample were classified in four subsamples: family-backed IPOs, private equity-backed IPOs, public body-backed IPOs, bank-backed IPOs.

- (1) *Family*: an individual founder of the IPO company or a member of the family who founded the company or historically controlled it.⁷
- (2) *Private equity*: under this definition I include: (a) private equity funds; (c) venture capitalists; (c) banks acting as private equity investors; (d) asset management funds; (e) executive directors or members of the management board, not belonging to any historical family or without any founder role, who had previously acquired stakes in the company capital through management buy out (MBO) or management buy in (MBI) operations.

These sub-categories are grouped assuming similar policies as for timing and pricing of IPOs.

- (3) *Public Body*: a national government, local authority or government agency.
- (4) *Bank*: a bank or other financial institution holding a share of the capital of another bank or financial institution.

Some specifications: firstly, managers owning a share in the IPO company are classified as *family* only if they are also founders or they belong to the family which founded the firm; otherwise, if they acquired a stake only after the foundation, through MBO or MBI, they are classified as *private equity* investors. Secondly, as anticipated in 3.3, banks are classified as *private equity*

⁷ Usually IPO prospectuses report the name of founding shareholders ("soci fondatori") or information about the history of the company, which helps understanding the dynamics of control during the years.

investors if they own a stake in a non financial company, otherwise they are included in a separate *bank* group.

As for how to define if a company is *backed* by one or another type of shareholder, I adopt a criterion which, instead of looking at the ownership structure before the IPO, i.e. at the shares owned by each shareholder, analyzes the dilution occurred due to the issue.

As ‘dilution’ I refer here to the difference between the shares of the company capital held by each shareholder after the IPO and before the IPO. The total dilution is the sum of each shareholders’ dilution, and obviously equals the fraction of the capital post IPO offered to the public. Of the total dilution I calculate the percentage attributable to each class of shareholders. Then I classify the IPO company depending if the majority of the dilution is attributable to one of the groups listed above. If this classification is used, all the IPOs belong to one of the four types listed above.

As an example, consider the IPO of Marazzi, in 2006: before the listing the Marazzi family controlled, both directly and indirectly, approximately 65% of the firm share capital; 33% was owned by a private equity fund and the remaining 2% by managers. Looking at the ownership structure, this company would be family-controlled. But of the total dilution due to the listing (28.2% of the share capital post IPO), 84% is attributable to private equity type shareholders. Hence this IPO is finally classified as private equity-backed IPO.

This criterion is adopted for a few reasons: not only controlling, but also minority shareholders holding a significant fraction of the company could participate in the decision of *timing* and *pricing* the IPO. This is even more true if the minority shareholders are those who suffer the highest dilution. In the literature, 15-20% of the voting shares is assumed to be sufficient for exerting a determinant influence over a company (Rigamonti (2007); Faccio and Lang (2002)). In the case of Marazzi, it is difficult to think that the pricing policy is planned by the controlling shareholder alone. An active role for the private equity fund must be assumed. In Italy there are many cases as Marazzi, where the control of the firm is held by families but are private equity which sell at the IPO: e.g. Bolzoni, Marr, Campari, Giacomelli, Mirato, Air Dolomiti, Vemer Siber. And, according to 3.3, the fact that are investment funds who liquidate is a *signal* to the market independently from who controls the firm.⁸

⁸ Note that if shareholders dilute in the same proportion (e.g. if all IPO shares are newly issued) who holds the majority of the dilution also holds the majority of the share capital before the listing.

5. Descriptive statistics

5.1 *Descriptive statistics: whole sample*

Table 3 reports the level of underpricing for the three different measures presented in 1.3, calculated over the whole sample of 160 IPOs and on subsamples after excluding financial IPOs and privatizations.

The mean level of underpricing, both simple and adjusted (7.31% and 7.67% respectively), is positive and statistically different from zero, thus confirming the existence of an ‘underpricing phenomenon’. It seems lower than those calculated in previous studies on Italian IPOs (see Table 1), but comparable to the level of underpricing of *bookbuilding* IPOs (after excluding Finmatica) in Arosio et al (2000) and Cassia et al (2004) (respectively 8.1% and 7.2%). The lower underpricing for open price IPOs is seen as a confirmation of the hypothesis of Benveniste and Spindt (1989) that bookbuilding could reduce asymmetry of information thus reducing underpricing (Cassia et al (2004): 180; Arosio et al (2000): 17).

Interestingly, midpoint underpricing is always lower than the two other measures, since, on average, the IPO price is chosen in the lower half of the price range, below the midpoint. This is confirmed by the fact that the average price revision is negative (Table 5).

Looking at the number of underpriced and overpriced IPOs (Table 4), almost 2/3 of the issues show a positive initial adjusted return, a result comparable to previous studies (see Table 1). As for the *midpoint* underpricing, only one IPO out of two observes a positive return.

Table 3: Underpricing. Whole sample

(a) Whole Sample : 160 IPOs						
	Mean	Median	St. Dev	Min	Max	No.Obs
Simple underpricing	7.31%***	1.38%	0.163	-14.11%	101.60%	160
Adjusted underpricing	7.67%***	2.85%	0.158	-14.78%	99.37%	159
Midpoint underpricing	5.94%**	1.74%	0.289	-44.44%	188.71%	160
(b) Excluding Financial IPOs : 146 IPOs						
	Mean	Median	St. Dev	Min	Max	No.Obs
Simple underpricing	7.25%***	1.01%	0.169	-14.11%	101.60%	146
Adjusted underpricing	7.57%***	2.27%	0.164	-14.78%	99.37%	145
Midpoint underpricing	5.43%**	-1.68%	0.300	-44.4%	188.71%	146
(c) Excluding Financial IPOs and Privatizations : 130 IPOs						
	Mean	Median	St. Dev	Min	Max	No.Obs
Simple underpricing	6.99%***	0.94%	0.173	-14.11%	101.60%	130
Adjusted underpricing	7.26%***	1.86%	0.168	-14.78%	99.37%	129
Midpoint underpricing	4.83%*	-3.08%	0.310	-44.44%	188.71%	130

*, **, *** : mean statistically different from zero at 10%, 5% and 1% level

Table 4: Number of underpricing / overpricing

(a) Whole Sample : 160 IPOs				
	No. Underpricing	% of sample	No. Overpricing	% of sample
Simple underpricing	92	57.5%	68	42.5%
Adjusted underpricing	103	64.8%	56	35.2%
Midpoint underpricing	81	50.6%	79	49.4%
(b) Excluding Financial IPOs : 146 IPOs				
	No. Underpricing	% of sample	No. Overpricing	% of sample
Simple underpricing	80	54.8%	66	45.2%
Adjusted underpricing	90	62.1%	55	37.9%
Midpoint underpricing	69	47.3%	77	52.7%
(c) Excluding Financial IPOs and Privatizations : 130 IPOs				
	No. Underpricing	% of sample	No. Overpricing	% of sample
Simple underpricing	69	53.1%	61	46.9%
Adjusted underpricing	77	59.7%	52	40.3%
Midpoint underpricing	59	45.4%	71	54.6%

Table 5 provides some summary statistics with data about the offer and IPO firms' characteristics. Some results deserve more attention.

The shares offered to the public at the IPO represent, on average, only one third (32.5%) of the share capital post IPO. This confirms the results of Rigamonti (2007) and the hypothesis, formulated in section 3, that, given the existence of significant private benefits of control, shareholders will list only a minority stake of the company. Of the shares offered, on average approximately 64% comes from the issue of new rights (OPS), while the residual part are sold by existing shareholders (36% in OPV). Three quarters of the offer are generally reserved to institutional investors, while retail investors only receive the residual 25% of the shares.

As for the size of IPO companies, proxied by the book value of the Total Assets in the last available annual report before the IPO, the mean value (1.5 billions euro) substantially reduces after excluding financials and privatizations, due to the large size of banks and of public utilities privatized.

Market momentum is proxied by (a) the return of the Italian market index (Mibtel) on a period of 100 days before the listing, as in Cassia et al (2004) and Boreiko and Lombardo (2008), and (b) the average Price to Book of the Mibtel of a 15 weeks period before the listing, following Pagano et al (1998). The market return is not statistically different from zero, hence not confirming the hypothesis that, on average, IPOs are planned after a 'hot market' period so as to exploit possible mispricing or overvaluations.

The oversubscription rate (OR), available both for retail and institutional investors, is calculated as the ratio between the number of shares requested by and the number of shares reserved to each class of investors at the public offering. On average, IPOs have been oversubscribed 5.7 times. The mean retail oversubscription rate is higher, but not statistically different, than the institutional oversubscription rate. Only in 7 IPOs (4.4% of the sample) shares requested were less than those offered (OR<1).

Table 5 - Offer and IPO companies characteristics

	(a) Whole Sample					(b) Excluding Financial IPOs					(c) Excluding Financial IPOs and Privatizations				
	No. IPOs	Mean	St.Dev	Min	Max	No. Obs	Mean	St.Dev	No. Obs	Mean	St.Dev	No. Obs	Mean	St.Dev	No. Obs
No. IPOs						160			146			130			
No. days of the public offer	4.5***	3.554		1	16	160	4.6***	3.620	145	4.6***	3.666	129			
Price range	29.4%***	0.424		1.8%	540%	160	29.9%***	0.442	146	30.9%***	0.467	130			
Price revision	-3.7%***	0.138		-45.5%	73.0%	160	-4.3%***	0.142	146	-4.8%***	0.147	130			
shares offered as a % of share capital post IPO	32.5%***	0.095		10.3%	65.8%	160	33.0%***	0.092	146	33.2%***	0.094	130			
Fraction of the offer of newly issued shares (OPS)	63.7%***	0.362		0%	100%	160	65.3%***	0.353	146	67.2%***	0.342	130			
Fraction of the offer of existing shares sold (OPV)	36.3%***	0.362		0%	100%	160	34.7%***	0.353	146	32.8%***	0.342	130			
Fraction reserved to Retail investors	25.6%***	0.134		0%	100%	160	24.7%***	0.119	146	23.4%***	0.110	130			
Fraction reserved to Institutional investors	74.4%***	0.134		0%	100%	160	75.3%***	0.119	146	76.6%***	0.110	130			
Oversubscription rate	5.7***	6.852		0.7	50.2	160	5.6***	7.124	146	5.5***	7.226	130			
Retail Oversubscription rate	6.1***	7.969		0.3	48.9	151	6.1***	8.296	137	6.1***	8.394	121			
Institutional Oversubscription Rate	5.5***	7.994		0.4	74.1	159	5.4***	8.256	146	5.2***	8.467	130			
% exercise Greenshoe option	55.9%***	0.454		0%	100%	150	54.0%***	0.454	139	51.0%***	0.459	124			
Total Assets (book value, mn euro)	1,477***	7,770		0.02	81,500	154	758***	4,210	141	301***	939	125			
Market return (100 days period before the listing date)	0.01%	6.25%		-19.7%	17.8%	160	-0.07%	6.38%	146	0.11%	6.02%	130			
Price to Book of the market index (15 weeks period before the listing date)	2.21***	0.320		1.55	2.69	160	2.21***	0.321	146	2.22***	0.31	130			
IPO share volatility (10 days period since 2nd day of trading)	0.194%***	0.513%		0.00003%	4.642%	159	0.200%***	0.530%	145	0.182%***	0.493%	129			
Difference of means	/ t /						/ t /			/ t /					
OPS and OPV	6.76***						7.37***			5.72***					
Shares reserved to Retail and Institutional investors	32.56***						36.30***			38.97***					
Retail and Institutional OR	0.67						0.66			0.89					

*, **, *** : means or difference of means statistically different from zero at 90%, 95% and 99% level

Tests about two population means have been performed after testing the hypothesis that the variances of the two populations are equal. Given a statistically significant difference between the variances, I compute the approximate t using the individual samples variances instead of the pooled variances, and using the Satterthwaite (1946) approximation of the degrees of freedom.

Table 6 – Oversubscription rate and Underpricing

Underpricing levels	No. Obs	Mean Oversubscription Rate	Retail Oversubscription Rate	Institutional Oversubscription Rate
<i>Simple underpricing (UP)</i>	<i>N</i>	<i>MEAN_OS</i>	<i>RET_OS</i>	<i>INS_OR</i>
UP < 0%	54	2.66	2.99	2.37
0% < UP < 5%	39	3.53	3.65	3.55
5% < UP < 10%	21	6.55	5.82	7.63
10% < UP < 20%	21	7.77	8.28	7.30
20% < UP < 30%	10	11.27	9.29	14.69
30% < UP < 50%	10	12.11	15.79	9.46
UP > 50%	5	19.09	27.21	10.96
Mean	23	5.70	6.11	5.50
Total	160			
<i>Adjusted underpricing (ADJ_UP)</i>	<i>N</i>	<i>MEAN_OS</i>	<i>RET_OS</i>	<i>INS_OR</i>
ADJ_UP < 0%	56	2.94	3.12	2.82
0% < ADJ_UP < 5%	35	3.04	3.15	3.05
5% < ADJ_UP < 10%	21	6.52	6.28	7.14
10% < ADJ_UP < 20%	26	7.21	7.46	7.17
20% < ADJ_UP < 30%	8	13.16	10.97	16.44
30% < ADJ_UP < 50%	8	13.72	16.91	10.52
ADJ_UP > 50%	6	16.82	27.21	10.05
Mean	23	5.70	6.11	5.50
Total	160			

As in Brennan and Franks (1997: 403), I report in Table 6 the level of oversubscription per class of underpricing, to see if a correlation between the two variables exists. The mean and the retail oversubscription rate increase monotonically with underpricing, while the institutional oversubscription shows a different pattern. Hence a clear relation between underpricing and OR can be evidenced as in Brennan and Franks (1997:402-404), thus supporting the hypothesis that issuers can underprice the share to generate higher demand, discriminate against large applicants and help retaining control (see 2.2.5). However, so as to fully test Brennan and Franks' hypothesis also the rationing policies should be analyzed. This is not possible here due to lack of data about IPO shares' allocation (see Table 11).

In addition a problem of reverse causality exists: the oversubscription rate itself can influence the level of underpricing, since the information about the oversubscription is disclosed *before* both the IPO price and the closing price of the first day of trading are determined (Figure 1). A high oversubscription could signal the market of the good quality of the firm hence propelling the market demand, thus increasing the price on the open trading. In the regression analysis of 6.1, where underpricing acts as dependent variable, the oversubscription rate is included among the regressors.

5.2 Descriptive statistics: IPOs per type of shareholding

Table 7a and 7b provide summary statistics after dividing the sample according to the type of shareholder backing the IPO, adopting the classification presented in 4.3. 85 companies (53% of the sample) are family-backed IPOs, 49 (30.6%) are private equity-backed IPOs, 18 (11.2%) are public body-backed and 8 (5%) are bank-backed.

Focus is posed on the differences between the first two groups, and tests about the two population means are also estimated.

As hypothesized in 3.3, family-backed IPOs present the highest level of *simple* and *adjusted* underpricing among the four subsamples. On the contrary, as hypothesized, private equity backed IPOs are on average overpriced, with a mean initial return of -0.71%, not statistically different from zero. The difference of means between the two groups is statistically significant. The regression analysis of 6.1 will test if this difference is robust even after controlling for other variables influencing the level of underpricing. In addition, 77.4% of family-backed IPOs have a positive initial adjusted return, while 67.3% of private equity backed IPOs debut on the stock exchange with a negative return.

Table 7a: Family-backed and Private Equity-backed IPOs

	Family backed IPOs			Private Equity backed IPOs			Difference of means
No. IPOs per type	85			49			
	Mean	St.Dev	No. Obs	Mean	St.Dev	No. Obs	t
Simple underpricing	11.61%***	0.195	85	-0.71%	0.067	49	5.31***
Adjusted underpricing	11.84%***	0.189	84	-0.16%	0.070	49	5.24***
Midpoint underpricing	8.54%***	0.291	85	-0.55%	0.325	49	1.67*
Price range	33.1%***	0.568	85	26.9%***	0.146	49	0.94
Revision	-3.8%**	0.159	85	-5.8%***	0.119	49	0.81
Shares offered as a % of share capital post IPO	30.8%***	0.080	85	37.3%***	0.105	49	3.77***
% existing shares sold (% OPV)	29.2%***	0.312	85	40.4%***	0.303	49	2.01**
% reserved to Institutional investors	76.6%***	0.116	85	76.2%***	0.102	49	0.22
Mean Oversubscription rate	6.75***	8.390	85	3.44***	3.198	49	3.25***
Retail Oversubscription rate	7.67***	9.865	79	3.32***	2.771	46	3.68***
Institutional Oversubscription Rate	6.12***	9.824	85	3.66***	4.544	49	1.97*
% exercise Greenshoe option	62.7%***	0.463	78	34.0%***	0.398	48	3.56***
Total Assets (book value, mn euro)	323.6***	1,118	81	279.8***	497.8	47	0.30
Market return (100 days period before the listing date)	0.17%	0.062	85	-0.26%	0.057	49	0.39
Price to Book of the market index (15 weeks period before the listing date)	2.24***	0.309	85	2.19***	0.325	49	0.77
IPO share volatility (10 days period since 2nd day of trading)	0.26%***	0.602%	85	0.05%***	0.07%	48	3.23***

*, **, *** : mean or difference of means statistically different from zero at 90%, 95% and 99% level

Tests about two population means are performed after testing the hypothesis that the variances of the two populations are equal.

Given a statistically significant difference between the variances, the approximate *t* is computed using the individual samples variances instead of the pooled variances, and using the Satterthwaite (1946) approximation of the degrees of freedom.

Other hypothesis of 3.3 are also confirmed: families list a smaller share of the capital than private equity investors (30.8% and 37.3% respectively), which means that they are more inclined to retain control of the firm than private equity investors; interestingly also public bodies and banks offer smaller stakes than private equity investors.

Table 7b: Public Body-backed and Bank-backed IPOs

No. IPOs per type	Public Body backed IPOs			Bank-backed IPOs		
	18			8		
	Mean	St.Dev	No. Obs	Mean	St.Dev	No. Obs
Simple underpricing	8.47%***	0.125	18	8.11%*	0.111	8
Adjusted underpricing	9.19%***	0.119	18	8.49%**	0.101	8
Midpoint underpricing	9.82%**	0.186	18	9.35%	0.166	8
Price range	20.0%***	0.078	18	26.0%***	0.080	8
Revision	0.6%	0.082	18	0.8%	0.078	8
Shares offered as a % of share capital post IPO	30.2%***	0.080	18	25.1%***	0.094	8
% existing shares sold (% OPV)	54.2%***	0.410	18	46.3%***	0.375	8
% reserved to Institutional investors	65.1%***	0.145	18	60.7%***	0.265	8
Mean Oversubscription rate	6.59***	6.118	18	6.32***	3.015	8
Retail Oversubscription rate	6.25***	7.377	18	6.32***	3.960	8
Institutional Oversubscription Rate	6.92***	6.100	18	7.03***	4.369	7
% exercise Greenshoe option	80.9%***	0.316	17	69.4%***	0.477	7
Total Assets (book value, mn euro)	9,133**	21,400	18	2,971**	4,101	8
Market return 100 days period before the listing date	-1.21%	0.085	18	2.63%	0.047	8
Price to Book of the market index (15 weeks period before the listing date)	2.13***	0.364	18	2.14***	0.306	8
IPO share volatility (10 days period since 2nd day of trading)	0.31%**	0.733%	18	0.07%*	0.093%	8

*, **, *** : mean statistically different from zero at 10%, 5% and 1% level

As hypothesized in 3.3, IPOs backed by investment funds have a higher fraction of OPV shares than family-backed ones (40.4% and 29.2%). The percentage of OPV shares is even higher, as expectable, in the case of privatizations and financial IPOs (54.2% and 46.3%): in fact the State, local authorities and banking foundations use IPOs for liquidating their position in favour of the public.

Listing of formerly state owned companies (ENEL) and of important banks (Monte dei Paschi di Siena) is reflected by the high book value of total assets (9.1 and 3 euro billions) of public bodies-backed and bank-backed IPO companies, while the other two groups do not statistically differ in terms of size and have smaller IPO companies.

Finally, family-backed IPOs and private equity backed IPOs do not differ neither in terms of width of the price range nor of market momentum (market return and Price to Book).

5.3 Pricing policies and price revision

Table 7a and 7b show that, while public bodies and banks do not revise their price down (0.6% and 0.8% respectively, not statistically different from zero), both families (-3.8%) and private equity (-5.8%) report negative revisions, which are not statistically different each other, although the level of oversubscription is significantly higher for the family group (6.75 against 3.44). This supports the idea that families could *intentionally* underprice the IPO share.

It must be considered that, even if the price revision is done after observing the level of demand registered during the public offering, «the final IPO price will not be determined by a mechanistic crossing of demand and supply. [...] Little is known about how investment banks use the information in the book to determine the final price as they tend to keep their books firmly shut to outsiders (including academic researchers)» (Jenkinson and Ljungqvist (2001): 18).

Insights into the pricing decisions can be inferred only by analyzing after the IPO the relative position of P_{CLOSE} , P_{MID} , P_{IPO} (Table 8).

To measure how the total difference between the expected value and the «fair value» of the IPO company is split between price revision and initial return (remind 1.3 and Figure 2), I decided to calculate the ratio between *simple* and *midpoint* underpricing. The average ratio for the whole sample is 57.6% which reduces to 46.2% considering only the 113 IPOs in which the IPO price is fixed in between the midpoint and the closing price on the first day of trading ($P_{MID} \geq P_{IPO} \geq P_{CLOSE}$ or $P_{MID} \leq P_{IPO} \leq P_{CLOSE}$, i.e. cases (c), (f), (g) and (i) of Table 8). This means that approximately half of the *midpoint* underpricing is embodied on the first day of trading, while the other half is embodied in the price revision, confirming the «partial adjustment theory» (Hanley (1993); Benveniste and Spindt (1989); see 2.2.2): the price will be only partially revised by the issuer after the public offering and a residual movement on the first day of trading remains.

Table 8 – Pricing policies

	Pricing class	FAMILY	%	PRIVATE EQUITY	%	PUBLIC BODIES	%	BANK	%	TOTAL	%
Overpricing CLOSE<IPO	(a) CLOSE<MID<IPO	3	3.5%	2	4.1%	0	0.0%	0	0.0%	5	3.1%
	(b) MID<CLOSE<IPO	1	1.2%	6	12.2%	0	0.0%	0	0.0%	7	4.4%
	(c) CLOSE<IPO<MID	16	18.8%	21	42.9%	3	16.7%	2	25.0%	42	26.3%
Underpricing IPO<CLOSE	(d) IPO<MID<CLOSE	13	15.3%	1	2.0%	1	5.6%	1	12.5%	16	10.0%
	(e) IPO<CLOSE<MID	13	15.3%	5	10.2%	1	5.6%	0	0.0%	19	11.9%
	(f) MID<IPO<CLOSE	29	34.1%	7	14.3%	11	61.1%	5	62.5%	52	32.5%
	(g) MID=IPO<CLOSE	4	4.7%	1	2.0%	0	0.0%	0	0.0%	5	3.1%
Other	(h) MID=CLOSE	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	(i) MID<IPO=CLOSE	6	7.1%	6	12.2%	2	11.1%	0	0.0%	14	8.8%
	TOTAL	85	100%	49	100%	18	100%	8	100%	160	100%

But if fixing the IPO price in between the midpoint and the closing price is widespread among bank-backed and public body-backed IPOs (87.5% of the cases and 88.9% respectively), families and private equity investors show less predictable pricing decisions.

In 35.3% of the cases families fix the IPO price below (or at the same level of) P_{MID} (cases (d), (e) and (g)); in 20% of the cases ((d) and (g)) this occurs even if the «fair value» determined by the market is above the midpoint of the range.

On the contrary in 28.5% of the cases ((a), (b) and (i)), private equity investors generate overpricing or zero initial return by fixing the price above the midpoint; and overpricing is observed even when the «fair value» would be itself above the *ex ante* expected value (case (b)).

The evidence thus suggests and confirms that families could *intentionally* underdetermine the IPO price so as to induce a positive initial return, while private equity fix the IPO price as high as possible, often resulting in overpricing.

6. Regression analysis. Underpricing and price revision

To deepen the analysis of price revision and initial return, in this section two models are provided which analyze the main determinants of the two variables.

6.1 Underpricing

Multivariate OLS regressions with *simple* and *adjusted* underpricing as dependent variables are estimated to test if the ‘type of shareholder’ effect holds even after controlling for other variables which, on the basis of the hypothesis formulated in 3.3 and according to the theories reviewed in 2.2, could be correlated with the initial return. As for how measures of underpricing are calculated, see 1.3.

As for the regressors: using the classification presented in 4.3, IPOs are controlled for according to the type of shareholder backing the issue. *FAMILY* is a dummy equalling 1 if the IPO is a family-backed issue; *PUBODY* is a dummy for public body-backed IPOs and *BANK* is a dummy for bank-backed IPOs. The base group is represented by the subsample of private equity-backed IPOs. As hypothesized in section 3 the sign of the coefficient of *FAMILY* should be positive. When financial IPOs and privatizations are excluded from the sample, then respectively *BANK* and *PUBODY* dummies are dropped from the model, since all bank-backed IPOs are financial IPOs and all public body IPOs are privatizations.

38 companies (24% of the sample) went public on the Nuovo Mercato. Companies listed on tech markets or new markets could show different patterns in terms of initial return than traditional companies (Giudici and Roosenboom (2002); Goergen et al (2003)). Hence a control dummy is included (*NEWMKT*).

To test the other hypothesis formulated in 3.3 I include among the regressors also both the percentage of the share capital post IPO offered to the public (*SHARE_OFFER*) and the fraction of existing shares sold (*OPV*): for both, a negative correlation should be observed, since higher dilutions and selling could signal that the IPO is used to liquidate the investment, and hence that less likely IPO shares would be underpriced (3.3 for details).

The theory (see 2.2.1) predicts that the higher the uncertainty around the issue, the higher the underpricing required to compensate the investor «for the costs of being informed» (Ritter (1984): 220). Two proxies for ex ante uncertainty are included in the model: the % width of the

price range (*RANGE*), calculated as $\left(\frac{MAX_i - MIN_i}{MIN_i} \right) * 100$, since «the wider the offer range, the

greater the uncertainty around an issue» (Hanley (1993): 239), and, as in Cassia et al (2004) the size of the IPO company in terms of book value of the total assets (*TOTAL_ASSETS*): the smaller a firm, the higher the uncertainty around the IPO.

As for the IPO share volatility (*SHARE_VOLATILITY*), used by Ritter (1987), Prabhala and Puri (1998) as proxy for ex ante risk, theoretical problems exist: information about the volatility is not available before the IPO (Figure 1), hence is difficult to interpret it as a proxy for *ex ante* uncertainty (Jenkinson and Ljunqvist (2001): 69); in addition, volatility could be even influenced by the first day return, thus a problem of reverse causality also exist. Hence the model is run both excluding the IPO share volatility (Table 9a) and including it (Table 9b). However results do not substantially differ between the two versions.

The age of the IPO company, which could be correlated with the initial return (the younger a company, the higher the uncertainty, the higher the underpricing) is not included since data for most companies were missing, and in any case no evidence of a significant correlation between age and underpricing as for Italian IPOs exists (Cassia et al (2004), Arosio et al (2000), Boreiko and Lombardo (2008)).

As hypothesized by Hanley (1993: 232), the price revision (*REVISION*) operated by the issuer could signal to the market the direction of the initial return (see 2.2.2): hence a positive correlation must be expected. To control if the level of underpricing could be correlated with the market momentum (see 2.2.3), the return of the market index (*MIBTEL*) on a period of 100 days before the listing is included in the model as in Cassia et al (2004), Boreiko and Lombardo (2008).

Finally the level of oversubscription at the public offering, both for retail and institutional demand (*RETAIL_OR* and *INSTITUTIONAL_OR*), is included: higher oversubscription during the IPO could signal to the market of the good quality of the IPO firm, hence propelling the demand on the first day of trading, thus increasing the initial return.

The model hence is:⁹

$$UP_i = \beta_0 + \beta_1 FAMILY_i + \beta_2 PUBODY_i + \beta_3 BANK_i + \beta_4 NEWMKT_i + \beta_5 SHARE_OFFER_i + \beta_6 OPV_i + \beta_7 RANGE_i + \beta_8 REVISION_i + \beta_9 RETAIL_OR_i + \beta_{10} INSTITUTIONAL_OR_i + \beta_{11} MIBTEL_i + \beta_{12} TOT_ASSETS_i + [\beta_{13} SHARE_VOLATILITY_i] + \varepsilon_i$$

The model is estimated over the whole sample and also after excluding financial IPOs and privatizations.¹⁰ The coefficients of the independent variables in the regressions are reported in

⁹ *SHARE_VOLATILITY* is in parenthesis since, as anticipated above, the model is run both including and excluding this variable.

¹⁰ As for some of the independent variables of the model, data were missing for some companies. Hence the sample of 160 IPOs reduces to 144 usable observations, the sample of 146 companies (excluding financial IPOs) reduces to 132 and the sample of 130 IPOs (excluding financial and privatizations) to 116. As for details about where data are missing, see the number of observations for each variable in Tables 3 and 5.

Table 9a and 9b. Statistics are adjusted using White (1980) heteroscedastic-consistent standard errors.

Table 9a – Underpricing OLS regressions

variable	Dep. Variable: SIMPLE UNDERPRICING			Dep. Variable: ADJUSTED UNDERPRICING		
	(a) whole sample	(b) excluding Financial IPOs	(c) excluding Financial IPOs and Privatizations	(a) whole sample	(b) excluding Financial IPOs	(c) excluding Financial IPOs and Privatizations
Intercept	0.50	0.74	2.06	2.78	3.11	4.33
FAMILY	6.24 ***	6.08 ***	5.89 **	6.10 ***	5.96 ***	5.81 **
PUBODY	7.29 **	8.14 ***	-	6.87 **	7.70 ***	-
BANK	4.65	-	-	4.26	-	-
NEWMKT	2.29	3.29	2.85	1.24	2.01	1.56
SHARE_OFFER	-0.24 **	-0.27 **	-0.31 **	-0.27 **	-0.30 ***	-0.34 ***
OPV	0.04	0.06 *	0.06	0.04	0.06 *	0.06
RANGE	0.02	0.02	0.023	0.03	0.03	0.03
REVISION	-0.17	-0.19	-0.199	-0.13	-0.15	-0.16
RETAIL_OR	1.12 ***	1.12 ***	1.15 ***	1.09 ***	1.10 ***	1.12 ***
INSTITUTIONAL_OR	0.05	0.03	0.002	0.03	0.01	-0.02
MIBTEL	0.38 **	0.42 **	0.40 *	0.23	0.26	0.218
TOTAL ASSETS	-0.00018 ***	-0.0002 **	-0.001	-0.00019 ***	-0.00024 ***	-0.00069
No. Obs	144	132	116	144	132	116
F-test p-value	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001
Adj R-squared	35.94%	36.66%	35.57%	36.10%	36.67%	35.44%

*, **, *** : statistically different from zero at 10%, 5% and 1% level

The statistics are adjusted using White (1980) heteroscedastic-consistent standard errors;

BANK and *PUBODY* dummies are dropped from the model when excluding Financial IPOs and privatizations since all bank-backed IPOs are Financial IPOs and all Public Body-backed IPOs are privatizations.

Looking at Table 9a, first of all it must be noted that, before excluding privatizations, the coefficient on the family dummy is always positive and significantly different from zero at 1% level: holding other factors fixed, the initial return of family-backed IPOs is more than 6% higher than private equity backed IPOs, hence confirming the hypothesis of section 3, both as regards *simple* and *adjusted* underpricing. Also the coefficient on the public body dummy is highly significant (relative difference of 7.3% and 6.9% w.r.t. private equity IPOs), while the bank dummy, is not statistically significant. Thus the ‘type of shareholder effect’ is robust even after controlling for other variables such as the ex ante uncertainty around the IPO, the firm size or the market momentum.

The results support also the hypothesis as for the sign of the coefficient on *SHARE_OFFER*: a 1% increase in the fraction of the capital post IPO offered to the public would decrease the initial return by approximately 0.30%. On the contrary the coefficient on the fraction of OPV sold (*OPV*) is nor economically nor statistically significant, and does not report the expected sign.

As for the uncertainty proxies, the % width of the price range (*RANGE*) has the expected sign but is neither economically nor statistically significant. In 6.2 it will be analyzed if the information contained in the price range is at least embodied in the price revision. On the other side, the size of the IPO company in terms of total assets (*TOTAL_ASSETS*) is, as expected, significantly negatively correlated with the level of underpricing: the bigger a firm, the lower the uncertainty around the IPO, hence the higher the level of underpricing. However the economic effect seems negligible (a 100 mn euro increase in total assets reduces underpricing by 0.02%).

Significantly correlated with the initial return is also the IPO share volatility (*SHARE_VOLATILITY*): a 0.1% increase in terms of volatility increases the underpricing by 0.94% (Table 9b). However, due to theoretical problems above explained, the model without including share volatility must be preferred. In any case results do not substantially differ between the two versions and the ‘type of shareholder effect’ holds even after including IPO share volatility.

As for the price revision, results don’t support Hanley (1993) hypothesis that positive price revisions would be followed by positive initial returns. The coefficient on *REVISION* has a negative sign and is never statistically significant. On the contrary the market momentum (*MIBTEL*) presents a significant explanatory power, but only in larger samples and only with simple underpricing, when the initial return is not corrected with the market return. A 1% increase in the *MIBTEL* would increase the IPO initial return by 0.39%: the ‘hotter’ the market momentum, the more likely an increase in the firm’s valuation, the higher the first day return.

The Price to Book of the market index was not included in the model since not statistically significant. Following Pagano et al (1998) it would be interesting to include the *sector* Price to Book (see table 11).

Finally, table 9a shows that a unitary increase in the oversubscription of retail investors would increase the initial return by 1.12%. This supports the hypothesis that the level of oversubscription at the public offering could signal the market of the good quality of the IPO hence propelling the demand on the first day of trading. Interestingly, it is the coefficient on the retail oversubscription rate (*RETAIL_OR*) and not on the institutional one (*INSTITUTIONAL_OR*) to be significantly correlated with underpricing: but it is not meaningful to compare the two variables since in Italy retail and institutional offerings are ruled by completely different legislations. In particular, retail orders at the IPO are binding, while institutional are not. Hence the retail demand could be more significant in terms of signalling to the market than institutional OR.

Table 9b – Underpricing OLS regression (including IPO share volatility)

variable	Dep. variable: SIMPLE UNDERPRICING			Dep. Variable: ADJUSTED UNDERPRICING		
	(a) whole sample	(b) excluding Financial IPOs	(c) excluding Financial IPOs and Privatizations	(a) whole sample	(b) excluding Financial IPOs	(c) excluding Financial IPOs and Privatizations
Intercept	1.93	2.22	2.99	4.13	4.49	5.21
FAMILY	5.43 ***	5.20 **	4.98 **	5.34 ***	5.14 **	4.96 **
PUBODY	4.45 *	5.08 *	-	4.24 *	4.89 *	-
BANK	4.91	-	-	4.48	-	-
NEWMKT	0.28	1.30	1.23	-0.59	0.21	0.06
SHARE_OFFER	-0.25 **	-0.29 **	-0.32 **	-0.28 ***	-0.32 ***	-0.35 ***
OPV	0.04	0.05 *	0.07 *	0.04	0.05	0.07 *
RANGE	0.02	0.03	0.03	0.03	0.03	0.04
REVISION	-0.18	-0.20	-0.22	-0.14	-0.17	-0.18
RETAIL_OR	0.76 ***	0.75 **	0.80 **	0.76 ***	0.75 **	0.80 **
INSTITUTIONAL_OR	0.14	0.12	0.076	0.11	0.093	0.045
MIBTEL	0.36 **	0.40 **	0.41 *	0.21	0.093	0.230
TOTAL ASSETS	-0.00012 ***	-0.00014 *	-0.001	-0.00013 ***	-0.00018 **	-0.00071
SHARE_VOLATILITY	9.43 ***	9.52 ***	9.61 **	8.73 ***	8.74 ***	9.00 **
<i>No. Obs</i>	143	131	115	143	131	115
<i>F-test p-value</i>	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
<i>Adj R-squared</i>	41.22%	42.06%	39.75%	40.76%	41.45%	39.18%

*, **, *** : statistically different from zero at 10%, 5% and 1% level

The statistics are adjusted using White (1980) heteroscedastic-consistent standard errors

BANK and *PUBODY* dummies are dropped from the model when excluding Financial IPOs and privatizations since all bank-backed IPOs are Financial IPOs and all Public Body-backed IPOs are privatizations.

6.2 Price revision

Finally, multivariate OLS regressions using price revision (*PRICE REVISION*) as dependent variable are estimated. Revision is calculated (see 1.3) as:

$$REVISION_i = \frac{(P_{IPOi} - P_{MIDi})}{P_{MIDi}} * 100 = \frac{\left[P_{IPOi} - \left(\frac{MAX_i + MIN_i}{2} \right) \right]}{\left(\frac{MAX_i + MIN_i}{2} \right)} * 100$$

where P_{IPOi} = IPO price of the i company and P_{MIDi} = midpoint of the price range.

It has to be reminded that the price is revised by the issuer on the basis of the information available after the public offering (Figure 1). First of all, it can be expected that a higher oversubscription rate during the offering will signal to the issuer the interest of the public to the IPO share; plausibly, the issuer will revise up the price of the offer. Hence both retail oversubscription rate (*RETAIL_OR*) and institutional (*INSTITUTIONAL_OR*) are included among the independent variables and a positive correlation with the revision must be expected.

The issuer will revise the price up also given a ‘hot market momentum’, proxied by the return on the market index on a period of 100 days before the listing (*MIBTEL*), as in Cassia et al (2004). The higher the return, the more likely an increase in the firm’s valuation, the higher the revision operated by the issuer.

Benveniste and Spindt (1989) and Hanley (1993) hypothesize that, the higher the ex ante uncertainty around the issue, the more likely a revision in the offer price. Here, as in 6.1, as proxies of the ex ante risk the % width of the price range (*RANGE*) (Hanley (1993)) and the size of the IPO company, in terms of total assets (*TOTAL_ASSETS*), are taken. Both must be positively correlated with underpricing. The IPO share volatility is not included in the model; once included, its coefficient is not statistically significant.

As for the fraction of the capital offered (*SHARE_OFFER*) and the percentage of existing shares sold (*OPV*) the effect should be the same as the one assumed on the initial return (6.1).

Dummies for the three groups of family-backed (*FAMILY*), public bodies-backed (*PUBODY*) and bank-backed IPOs (*BANK*) are considered, while private equity IPOs act as a benchmark. Also IPOs on the Nuovo Mercato (*NEWMKT*) are controlled for.

The model hence is:

$$REVISION_i = \beta_0 + \beta_1 FAMILY_i + \beta_2 PUBODY_i + \beta_3 BANK_i + \beta_4 NEWMKT_i + \beta_5 SHARE_OFFER_i + \beta_6 OPV_i + \beta_7 RANGE_i + \beta_8 RETAIL_OR_i + \beta_9 INSTITUTIONAL_OR_i + \beta_{10} MIBTEL_i + \beta_{11} TOT_ASSETS_i + \varepsilon_i$$

Results for the whole sample and after excluding financial IPOs and privatizations are provided in Table 10:¹¹

Table 10 – Price Revision OLS regression

variable	Dependent variable: PRICE REVISION		
	(a) whole sample	(b) excluding Financial IPOs	(c) excluding Financial IPOs and Privatizations
Intercept	-11.5 ***	-10.2 **	-10.1 **
FAMILY	-2.09	-2.59	-2.56
PUBODY	1.51	1.150	-
BANK	2.47	-	-
NEWMKT	-5.36 *	-5.20	-5.16
SHARE_OFFER	-0.02	-0.07	-0.07
OPV	0.045 **	0.05 **	0.06 *
RANGE	0.10 ***	0.11 ***	0.10 ***
RETAIL_OR	0.57 ***	0.60 ***	0.63 ***
INSTITUTIONAL_OR	0.39	0.37	0.34
MIBTEL	0.38 ***	0.40 ***	0.45 ***
TOT_ASSETS	0.0001 **	0.0002 ***	-0.0005
<i>No. Obs</i>	144	132	115
<i>F-test p-value</i>	<0.000001	<0.000001	<0.000001
<i>Adj R-squared</i>	45.55%	45.82%	44.46%

*, **, *** : statistically different from zero at 10%, 5% and 1% level

The statistics are adjusted using White (1980) heteroscedastic-consistent standard errors

First of all, the negative sign on the coefficient of the family dummy (*FAMILY*) must be noted: holding other factors constant, families revise down the offer price by 2%/2.5% more than private equity shareholders¹², hence confirming their propensity in increasing the extent of underpricing. Negative and significant is the coefficient on *NEWMKT*: firms listed on tech or new markets could be surrounded by higher uncertainty (Giudici and Roosenboom (2002)) and could intentionally revise down the price (on average, by -5.4%) to increase underpricing.

As hypothesized by Hanley (1993) and Benveniste and Spindt (1989), also other ‘uncertainty proxies’ as the price range (*RANGE*) and the size of the company (*TOT_ASSETS*) are positively and significantly correlated with the revision: an increase of 1% in the range increase the revision by 0.10% while the economic effect of the firm size appears negligible (a 100 million euro increase in the Total Assets leads to a 0.01% increase in the revision).

As expected, the oversubscription rate is highly significant: a unitary increase in the retail oversubscription rate (*RETAIL_OR*) increases the price revision by 0.57%; on the contrary the

¹¹ Due to some missing values, a reduction in the number of usable observations occurs. See note 10 for details.

¹² However, the dummy coefficient isn’t statistically different from zero.

institutional demand (*INSTITUTIONAL_OR*) appears not to be statistically significant. However, as anticipated in 6.1, it is meaningless to compare the two variables due to legislative differences.

More difficult to interpret are the results as for the share of the capital offered and the fraction of existing shares sold. *SHARE_OFFER* shows the correct sign, but it is not statistically significant; *OPV* has not the expected sign, and is statistically but not economically significant (a 1% increase in the percentage of OPV shares increases the revision only by 0.045%).

Finally, the revision is operated by evidently taking into account the market momentum: if on a 100 days period before the listing the market increases by 1%, the issuer lifts the price by approximately 0.4% so as to exploit investors' willingness to pay higher valuations (Cassia et al (2004)).

7. Conclusion

Over a sample of 160 Italian IPOs between 1999 and 2008, this paper examined analytically the relationship between IPO initial returns and the type of shareholders backing the company going public, providing empirical evidence of a significant relation between the two variables. It is the first time, to my knowledge, that such a relationship is studied in detail for Italian IPOs (and one of the first for European IPOs).

While family-backed IPOs, on average, are significantly underpriced (+11.6%), IPOs backed by private equity funds, venture capitalists, investment banks and management buyout specialists present a mean negative or zero initial return (-0.7%). This difference is robust even after controlling for the size of the company, the *ex ante* uncertainty around the issue and the market return (6.1).

An analysis of the use of price revision (5.3 and 6.2) suggests that families *intentionally* underprice the IPO shares by revising down, on average, the offer price before the listing, even if positive responses from buyers are observed during the public offering period.

It is also shown that at the IPO families offer smaller fractions of the company share capital than private equity type shareholders, and sell a lower percentage of existing shares (OPV shares), thus confirming the evidence of Rigamonti (2007) that private equity-type shareholders could use the IPO to (partially) liquidate their investment, while families aim at retaining control at the IPO and years after the listing.

Hence, considering also the peculiar Italian corporate governance system, it is hypothesized that, while private equity investors, exiting from the company, would maximise the proceeds of the IPO applying the highest price as possible, thus reducing the underpricing level, families could underprice so as to maximise long run proceeds, and to facilitate the exploitation of private benefits of control. This would be consistent with previous theories and evidences such as Brennan and Franks (1997).

The study provides also additional evidence about the function of *open price* IPOs in reducing the asymmetry of information and the level of underpricing, and also evidence in support to Hanley (1993) and Benveniste and Spindt (1989) “partial adjustment theory”: issuers embody in the price revision only part of the information available at the time of the offering, hence leaving room for a residual correction on the first day of trading. More precisely, approximately half of the total difference between the expected value (the midpoint of the price range) and the *ex post* «fair value» of Italian IPO companies is embodied in the price revision, while another half is embodied in the first day return.

But this paper represents only a preliminary step towards a full understanding of the relationship between ownership, type of shareholding and IPO return. To improve this study some directions of research are suggested and presented in Table 11. Problems which made it impossible to implement here these improvements are also reported.

Table 11 – Further improvements

Improvements	Main objectives	Problems
<i>Methodological issues</i>		
(a) Extending the analysis to Italian IPOs before 1999.	Increasing the number of observations.	Difficulties in obtaining IPO prospectuses before 1999.
(b) Using the <i>number of shares</i> held/sold instead of the <i>relative share</i> of the company capital held by each shareholder pre and post IPO.	Understanding if the dilution occurred due to selling of existing shares (OPV) or to the issue of new rights (OPS).	Lack of databases reporting number of shares held/sold per each shareholder.
<i>IPO and pricing policy issues</i>		
(c) Analyzing rationing and allocation of IPO shares by the issuer.	Providing more evidence in support of Brennan and Franks (1997) hypothesis, only partially tested here.	Lack of data about allocation and rationing of IPO shares.
(d) Including in the model the <i>sector Price to Book</i> , following Pagano et al (1998).	Find a better proxy for the market momentum	Variable biased due to the small number of companies listed in each sector in Italy.
<i>Ownership and shareholding issues</i>		
(e) Studying the use of shareholders' agreements in Italian IPOs.	Better understanding the instruments used by shareholders to retain control at the IPO.	Data on shareholders' agreements must be hand collected from each IPO prospectus. No databases exist.
<i>Performance issues</i>		
(f) Extending the analysis to IPO long run performance (2-3 years after the listing)	Analyzing if a relation between type of shareholder backing the IPO and long run performance of IPO companies also exist.	Difficulties in selecting an appropriate matching portfolio to which the IPO long run return should be compared.

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