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by

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Abstract

The price stabilization service consists of purchasing shares in the aftermarket in order to prevent price drops, and it is not mandatory. Using a sample of Italian IPOs, we find that only half of the IPOs that require this service are actually stabilized after going public and that price support is substantial for poorly performing IPOs. Nevertheless, the fees charged are not informative about the provision of this ancillary activity. Rather, the underwriter's reputation is negatively associated to the stabilization activity. Negative price revisions and negative (or low) underpricing, also drive the provision of these services.

Keywords: IPOs; Underwriters; Investment banks; Gross spread; Price stabilization.

JEL Code: G15, G24

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1 Introduction

Underwriters underprice IPOs and often, immediately after, repurchase shares in an attempt to stabilize the price. The theoretical explanations proposed by the literature for this phenomenon are very diverse. For instance, the option to stabilize can be interpreted as a put option offered to *informed* (institutional) investors as a reward for revealing information before the IPO (Benveniste, et al., 1996), or as a put option to recompense *uninformed* investors for the "winner's curse," in the spirit of Rock (1986) model (Chowdhry and Nanda, 1996). Despite several attempts (e.g. Wilhelm, 1999; Chen and Wilhelm, 2008; Zhang, 2004), the underwriters' conduct after the issue, when price stabilization is provided, remains opaque (Aggarwal, 2000).

The empirical studies on the price stabilization activity, however, are relatively few (Ruud, 1993; Hanley, et al., 1993; Schultz and Zaman, 1994; Benveniste, et al., 1998) perhaps because of the difficulties in accessing data. One obstacle with testing is that underwriters do not formally commit to price support, nor do they publicly disclose stabilizing activities. Underwriters do not explicitly commit to price support but, instead, decide ex post whether, and how much, to stabilize. Perhaps, a legally binding contract could be too costly to define (under what conditions the underwriter provides price support? how many shares and at what prices?) and to enforce (Lewellen, 2006). However, since trading activity may be profitable for underwriters, they may be motivated to intervene also when not needed. Viceversa, they may be reluctant to stabilize the price of IPOs when it is costly. Ellis et al. (2000) demonstrate that underwriters take substantial inventory positions when stabilizing stock price. The provision of price stabilization may therefore be subject to opportunistic behaviors from the underwriters, as it is an intrinsically profitable activity.

In this paper, we question whether the price stabilization activity is carried out by underwriters when actually needed. To this end, we employ Heckman and Tobit models to investigate the determinants of the underwriter's decision to grant price stabilization. The empirical setting of our paper is Italy, where we can access unique data provided by the stock exchange (Borsa Italiana), that enable us to identify the IPOs that were stabilized. We find that only half of the IPOs that require this service are actually stabilized after going public, that price support is substantial for poorly performing IPOs, and that underwriter's reputation is negatively associated with the stabilization activity.

The remainder of the paper is organized as follows. Section 2 explains the research design and methodologies. Results are summarized in Section 3, and Section 4 concludes the article.

2 Research design

2.1 Institutional setting

This paper focuses on the IPO market in Italy, for which we have data on the entire population of IPOs in the period 1999-2008[†]. Investigating the Italian underwriting market may be instructive, as its institutional setting is similar to most continental European countries, but significantly different from the US market (Abrahamson, et al., 2011). In Europe, the price stabilization activity is never mandatory, can be done in the first month of trading and cannot be done above the offering price, as regulated by the Commission Regulation 2273/2003. Allocation devices such as overallotment, a naked short position, and the greenshoe option are critical in both the decision and the extent of

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[†] We are grateful to Fabio Braga, Enrico Pellizzoni and Borsa Italiana for providing proprietary data and useful insights.
Data on underwriter services in the aftermarket are available only until 2008, due to a change in disclosure policies.

stabilization[‡]. Aggarwal (2003) shows that underwriters are used to short-sell IPO shares to the participants ('overallotment'). The short position is then covered either by exercising the 'green shoe' option (in the case of positive initial returns) or by open market repurchases (in the case of weak initial returns, thus supporting the demand for shares and stabilizing the price).

2.2 Sample and data

The sample consists of 167 IPOs taking place in Italy in the period from 1999 to 2008, in which the underwriter declares to stabilize the market price, if needed. We collect information on the characteristics of firms, offers, and underwriting syndicates directly from IPO prospectuses. Information regarding price stabilization and liquidity support is provided by Borsa Italiana through the MarketConnect database. In particular, we access the amounts of shares bought and sold by underwriters for stabilization and liquidity support purposes throughout the first month of trading. This information allows us to identify which IPOs are price-stabilized by underwriters, and to what extent[§].

2.2 Methodology and variables

In this paper, we investigate the determinants of the underwriter's decision to stabilize the price and the factors influencing its intensity. Since the intensity of the price stabilization activity is observable only when the underwriter decides to intervene, we correct for

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[‡] Overallotment occurs when the underwriter sells more shares than the issuer made available, by borrowing them from pre-IPO shareholders. The balance can be covered by giving back the corresponding amount of money (greenshoe) and/or shares (stabilization) to the lenders. In the first case, the underwriter can exercise the greenshoe option up to 30 days after the listing, and pay for shares at the offer price independently from the current market valuation. In the second case, the underwriter buys shares from the aftermarket and gives them back to the lenders. A naked short position occurs when overallotment is greater than 15% of the offer volume. The presence of a naked short position implies stabilization, since the greenshoe option is limited to 15% of offer volume. The greenshoe option and stabilization are not mutually exclusive. The choice of which strategy to adopt is determined by the aftermarket stock price: if it rises, buying shares would be more costly than exercising the greenshoe. Hence, stabilization is typically associated with poorly performing IPOs and is aimed at preventing price drops.

[§] Stabilization data are disclosed in a report transmitted to Borsa Italiana by the underwriter at the end of the first trading month.

selection bias by employing a two-step Heckman procedure. In the first step, the dependent variable is a dummy related to the underwriter's decision. Price performance during the first month is the driver for the provision of this service, but it is in turn influenced by stabilization activity, hence endogenous. Therefore, we adopt an instrumental variable approach by employing the following instruments[**] for the 1-month buy-and-hold abnormal return: pre-IPO market return, i.e. the return of the FTSE Italia MIB Index over 100 days prior the IPO; market momentum, i.e. the number of IPOs in Italy in the 12 months before listing; underpricing, i.e. the difference between the 1st day closing price and the offer price, in percentage of offer price; and claw back clauses to retail investors,[††] i.e. the fraction of shares shifted from institutional to retail investors, as percentage of the offer volume.

We consider variables in three categories: (1) firm and offer characteristics; (2) underwriter characteristics; (3) the options of the underwriters.[‡‡]

In the first group, we employ firm age at the IPO as a proxy for maturity, while size controls for economies of scale. We also include relative issue size, dilution ratio, and institutional allocation. To control for market conditions, we add the return of the *FTSE Italia MIB* index 100 days before the listing date (pre-IPO market return), and the number of IPOs in the previous twelve months (market momentum). Finally, we include price revision, claw-back clauses, and underpricing to control for the characteristics of the

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[**] Endogeneity of the 1-month BHAR is verified through Hausman (Hausman, J. A., 1978. Specification Tests in Econometrics. Econometrica 46**,** 1251-1271.) test. Valid instruments must both explain stock performance and be uncorrelated with the second stage regression residuals. Once tested their validity, we checked exogeneity with respect to the dependent variable in the main equation and excludability from the regression through Hansens's J test.

[††] Claw-back clauses are provisions allowing the underwriter to shift shares from one investor category to another, in order to manage different levels of oversubscription. Bertoni et al. (Bertoni, F., Lugo, S., and Giudici, G., 2008. The Strategic (Re)Allocation of IPO Shares. Politecnico di Milano.) find that underwriters in Italy increase the fraction of the shares allotted to the public when the first day return is negative.

[‡‡] A detailed definition of the variables is reported in the Appendix.

offer. Pre-IPO market return, institutional allocation, price revision and underpricing are proxies for performance[§§], while other variables such as firm size and offer characteristics are expected to influence the intensity of the stabilization.

The second set of determinants is related to the underwriter. First, we include a dummy to indicate when non-Italian banks are involved in the process. The underwriter's reputation is proxied by its market share (proceeds) in the Italian market.[***] The size of the underwriting syndicate is also included, because large syndicates allow to share the IPO risk (Torstila, 2001). We include the underwriter' the gross spread (how much underwriters are paid for taking the company public) to see whether fess have any predictive power regarding the price stabilization activity.[†††]

The third group includes variables measuring the options of the underwriters: the greenshoe, the overallotment, and the naked short option. For each option, dummies are used on the first regression to test the decision to stabilize, while the volume is used in the second regression on stabilization intensity.

3 Results

We examine the underwriters' conduct in providing price stabilization and liquidity support. Figure 1 offers a clear picture of how underwriters cover the initial short position, undertaken in 62.6% of the IPOs. The graph refers to the end of the first month of trading, and shows the average fraction covered by exercising the greenshoe option,

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[§§] We checked the validity of these variables by testing relevance (correlation with the endogenous explanatory variable) and exogeneity (no correlation with the error terms).

[***] We also defined underwriter reputation with reference to the number of IPOs managed instead of capital raised, finding similar results. These models are not reported in this paper.

[†††] As reported in Table 1, the median gross spread in Italy is 4%, lower than the tradition 'seven percent solution of US, but in line with previous studies in Europe (Chen, H. C., and Ritter, J. R., 2000. The seven percent solution. Journal of Finance 55, 1105-1131.; Ljungqvist, A. P., Jenkinson, T., and Wilhelm, J., William J., 2003. Global Integration in Primary Equity Markets: The Role of U.S. Banks and U.S. Investors. Review of Financial Studies 16, 63-99.).

and the average fraction covered by stabilizing the IPO, both expressed in percentage of the initial short position (i.e., 100% corresponds to the sum of overallotment and naked short, if any). IPOs are categorized in four groups, according to the number of days within the first month in which the IPO is traded below the offer price.

[FIGURE 1]

The largest fraction of short position is covered using the greenshoe option, which is exercised at a nearly constant rate, regardless of price trends. This is not particularly surprising, as underwriters have the incentive to exercise the greenshoe even for offerings that trade below the offer price, because they earn fees in percentage of all the shares issued. Price stabilization is more intense in bad performing offerings, confirming that aftermarket performance drives its provision. However, some stabilization activity occurs even when the stock price keeps persistently higher than the offer price. Stabilizing well performing offerings is costly for underwriters, and raises some questions about their behavior in the provision of aftermarket services.

Therefore, we try to unveil the determinants of the stabilization decision using a Heckman selection model. We include overallotment, naked short, and greenshoe dummies to control for short covering (i.e., 'non discretional' stabilization). The results of this model are shown in Table 1.

[TABLE 1]

Underwriters do seem to support bad performing IPOs. The coefficient of the instrumented variable for the first month buy-and-hold abnormal return is significantly negative, documenting that a poor aftermarket performance triggers the provision of this

service. Additionally, IPOs that experience a downward price revision are more likely to be stabilized.

However, foreign and more reputable underwriters are *less* likely to stabilize the issue. This result is in contrast with the findings of Lewellen (2006) that examines IPOs on the Nasdaq from 1996 yo 1999, finding a strong positive association between price support and underwriter size. Lewellen (2006) argues that underwriter reputation could be positively associated with stabilization activity ("reputation hypothesis") for two reasons. First, while overpricing may hurt the underwriter's reputation, the following price support can be viewed as an ex post action to repair the damage. Second, since stabilization is a discretionary activity, rather than a legally binding commitment, an higher reputation should increase the probability of this commitment to be honored. By contrast, our result is, in practice, an evidence of a "reversed reputation hypothesis" on the Italian market. The negative association between reputation and stabilization activity may be explained by the matching between issuer and underwriter (Fang, 2005): prestigious banks have stricter standards, so take public only high-quality firms which are less likely to underperform and are therefore less likely to need price support.

Conversely, the entity of the gross spread does not predict the decision to stabilize the price. Surprisingly, the overallotment, greenshoe option, and naked short dummies are not significant, even though all three should be crucial in the stabilization decision (short covering). These results point out that underwriters still act with a certain degree of discretion. The second column documents that neither offer size nor the extent of the short position (overallotment and naked short) are influential on the intensity of stabilization. Instead, the negative coefficient of the exercised greenshoe option confirms its substitutability for price stabilization.

4 Conclusions

This paper investigates short covering and price stabilization of IPOs, in a sample of 167 IPOs in Italy from 1999 to 2008. Only half of the IPOs with the underwriter 'available' to stabilize are then actually 'stabilized'. We investigate which factors determine this decision. In general, underwriters do seem to stabilize IPOs that actually need it, since bad performing offerings experiencing downward price revisions are more likely to be price-supported. Hence, underwriters act according to the issuer's interest. We also test whether the level of fees anticipates the actual provision of this ancillary service, but the results do not show any predictive power.

The nationality and reputation of the underwriter are also crucial in the stabilization decision: foreign and highly ranked banks act less promptly to support stock prices, probably because they take public only high-quality firms that are less likely to underperform. This results provide insights on why only half of the IPOs in Italy actually receive price stabilization. After controlling for all determinants that can discriminate offers expected to be riskier, the underwriter's reputation has a significant impact on the likelihood for an IPO to receive price stabilization. In practice, our results support the idea that underwriters with a better reputation are better in identifying, through unobservable characteristics, those issues that will not need any stabilization activity.

While a rich previous literature documents how underwriter reputation may signal the best IPOs (in terms of underpricing, post-IPO performance, etc.), to the best of our knowledge our paper is the first to provide evidence that underwriters with a better reputation identify offers that will receive less price stabilization.

Nevertheless, our result is in contrast with the findings of Lewellen (2006), that finds a positive association between underwriter reputation and price support on the Nasdaq, between 1996 and 1999. Why underwriter's reputation has a different relationship with price stabilization on different markets is still a puzzle, and calls for future comparative research.

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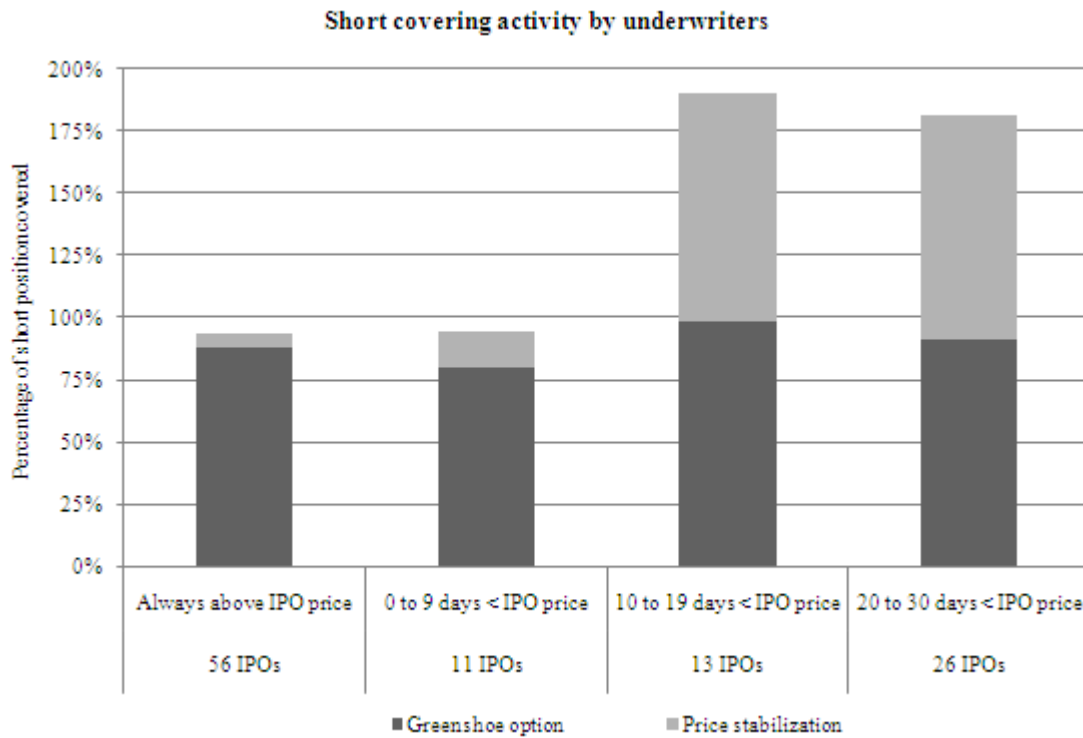## Table 1. Heckman selection model on stabilization activity

Sample of 167 Italian IPOs from 1999 to 2008 in which the underwriter declared to stabilize stock price if needed. Average, median, coefficients and statistics (in brackets) are reported. The dependent variables are: in step 1, stabilization dummy, equal to 1 if the underwriter stabilizes stock price; in step 2, stabilization intensity, i.e. the number of traded shares to stabilize stock price during the first month, scaled by first month turnover. Control dummies: industries, years, privatizations, ECOs, private placings, markets, VC-backing. Independent variables: *firm age* is the age in years of the company at the IPO*; issue size* is the log of IPO proceeds expressed in 2008 Euros; *relative issue size* is the offer volume in percentage of pre-IPO outstanding shares; *dilution ratio* is the fraction of newly issued shares as percentage of pre-IPO outstanding shares; *institutional allocation* is the fraction of shares reserved to institutional investors by prospectus; *pre-IPO market return* is the return of the FTSE Italia MIB Index over 100 days prior the IPO; *price revision* is the percentage difference between offer price and midpoint of the preliminary price range; *1-month BHAR* is the instrumented variable for aftermarket performance; *foreign underwriter* is the percentage of IPOs underwritten by a non-Italian bank; *underwriter reputation* is the fraction of capital raised in the sample, scaled at 1 for the 'national champion' Mediobanca; *syndicate size* is the number of members of the underwriting syndicate; *gross spread* is the underwriter's remuneration, in percentage of IPO proceeds*; overallotment* is a dummy equal to 1 in case of the underwriter sells shares in excess of the offered volume; *greenshoe* is a dummy equal to 1 in case the greenshoe option is exercised; *naked short* is a dummy equal to 1 in case the underwriter overallocates more than 15% of the offering; *overallotment volume* are overallocated shares in percentage of offer volume; *greenshoe volume* is the fraction of greenshoe exercised (0-15% of offer volume); *naked short volume* is the amount of naked short in percentage of offer volume.

[a] percentage of firms

	Average	Median	Step 1. Stabilization decision	Step 2. Stabilization intensity
Firm age (years)	32.1	19.0		0.03
				(1.31)
Issue size (€m)	303.0	95.2		0.06
				(1.29)
Relative issue size (%)	101.7	38.8		-0.08
				(-0.50)
Dilution ratio (%)	26.5	25.5		0.25
				(1.52)
Institutional allocation (%)	74.9	75.0	-1.33	
			(-1.06)	
Price revision (%)	28.8	35.1	-3.35***	
			(-3.64)	
1-month BHAR (%)	7.3	-1.0	-1.91***	
			(-2.79)	
Foreign underwriter[a]	23.0		-0.97***	
			(-2.93)	
Underwriter reputation (%)	22.3	6.0	-0.82**	
			(-2.00)	
Syndicate size (no.)	2.1	2.0	0.20	
			(1.23)	
Gross spread (%)	3.9	4.0	-0.24	
			(-1.47)	
Overallotment dummy[a]	62.6		-0.08	
			(-0.14)	
Greenshoe dummy[a]	61.4		-0.77	
			(-1.44)	
Naked short dummy[a]	4.7		0.92	
			(1.50)	
Overallotment volume (%)	7.2	7.8		-0.50
				(-1.50)
Greenshoe volume (%)	6.8	7.5		-0.81**
				(-2.01)
Naked short volume (%)	0.2	0.0		1.42
				(0.67)
Constant			10.9***	-0.31
			(3.36)	(-0.81)
Observations			167	
Censored			74	
Wald Chi-square			47.3	

Figure 1. Short covering activity by underwriters
The graph shows how underwriters have covered their initial short position at the end of the first month of trading. Dark grey is the fraction covered by greenshoe option, light grey is the fraction covered by price stabilization. Y-axis reports the percentage of short position undertaken by underwriters at the IPO, where 100% is the sum of overallotment and naked short, if present. Groups on the x-axis refer to the number of days (throughout the first 30 days of trading) in which the official daily price of the stock was below the offer price.

Appendix 1. Variable definitions

Name	Definition	Theoretical background
FIRM AND OFFER		
Firm age	Log of 1 plus firm age (in years) at the IPO	Higher uncertainty in younger companies
Issue size	Log of IPO proceeds adjusted for inflation, expressed in 2008 Euros	Economies of scale on gross spread (Lee, et al., 1996)
Relative issue size	Number of shares offered over pre-IPO outstanding shares	
Dilution ratio	Number of newly issued shares over pre-IPO outstanding shares	Newly issued shares increase underwriter's valuation uncertainty (Yeoman, 2001)
Institutional allocation	Fraction of shares reserved to institutional investors by prospectus	Institutional participation is necessary for an IPO to be successful (Aggarwal, 2000)
Pre-IPO market return	*FTSE Italia MIB* index return over 100 days prior the IPO	Market returns capture investment opportunities, investor sentiment and other unknown dynamics (Lowry, 2003)
Market momentum	Number of IPOs in the Italian market during the 12 months before listing	Favorable market sentiment makes trading activity more profitable for underwriters (Ellis, et al., 2000)
Price revision	Percentage difference between the offer price and the midpoint of the preliminary price range	Price revision should impound public and private information on investor demand gathered in the bookbuilding process (Benveniste and Spindt, 1989)
Claw-back to retail	Fraction of shares shifted from institutional to retail investors after the initial allocation, as percentage of total number of offered shares	Balance of cold demand of informed institutional investors with hot demand of non-informed retail investors (Bertoni, et al., 2008)
Underpricing	Percentage difference between first day official price and offer price	Spread and underpricing can be complementary (Kim, et al., 2010)
UNDERWRITER		
Foreign underwriter	Dummy for non-Italian lead underwriters	US banks underwriting European IPOs are more costly (Torstila, 2001)
Underwriter reputation	Amount of capital raised by the underwriter over the total capital raised in the sample (scaled to 1 = 'national champion' Mediobanca)	Reputable banks charge higher fees and provide higher quality services (Fang, 2005)
Syndicate size	Number of members of the underwriting syndicate	Syndicate size is important for the IPO risk sharing (Torstila, 2001)
UNDERWRITER OPTIONS		
Greenshoe dummy (volume)	Dummy equal to 1 in case the underwriter allocates more shares than made available by the issuer (Fraction of greenshoe of offer volume actually exercised)	Control for short covering in the decision (intensity) to provide aftermarket support
Overallotment dummy (volume)	Dummy equal to 1 in case the underwriter allocates more shares than made available by the issuer (Amount of shares over-allocated, as percentage of offer volume)	Control for short covering in the decision (intensity) to provide aftermarket support
Naked short dummy (volume)	Dummy equal to 1 in case the underwriter overallocates more than 15% of the offer volume (Fraction of over-allocated shares exceeding the 15% threshold)	Control for short covering in the decision (intensity) to provide aftermarket support