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What determines IPO underpricing ?

Evidence from a frontier market

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ABSTRACT

This paper empirically analyzes the short run performance of Tunisian initial public offerings (IPO). It sheds light on the determinants of IPO's in a context of a frontier market characterized by high information asymmetry, low information efficiency, thin trading and the presence of "noise" traders. Using a sample of 34 Tunisian IPO's from the period 1992-2008, we find that the average market adjusted initial return for the first three trading days is about 17.8 percent. The level of underpricing is related to retained capital, underwriter's price support, oversubscription, listing delay and the offer price. Age of the firm, its size and the size of the offer do not seem to reduce the amount of money left on the table by issuers. It appears also that underpricing is driven by irrational investors (ipoers) seeking for short-run capital gains. These results remain unchanged after controlling for the presence of institutional investors and the existence of liquidity contract.

KEYWORDS

Initial public offerings; Short-run underpricing; Underwriter's price support.

JEL Classification : G14 , G3

1. INTRODUCTION

Several empirical studies documented the existence of the initial underpricing phenomenon for newly listed firms during the early days of trading across many countries and capital markets. Early studies examined the performance of IPOs on the US market. Ibbotson (1975) find an average abnormal return of 11.4. Loughran and Ritter (1995) based on their survey of papers on the IPO underpricing report average initial returns of 10.0 per cent. More recently, Purnanandam and Swaminathan (2004) find returns ranging from 14.0 to 50.0 per cent depending on the matching criteria used. At the international level, most researchers have found mixed results compared to American findings. On the German market, Ljungqvist (1997) using a sample of 189 firms over the period 1970-1993 find an initial underpricing of about 10.9 per cent. In France, Jacquillat and MacDonald (1974) and Dubois (1987) report an initial underpricing respectively about 4.2 per cent and 19.0 per cent.

In the context of emerging markets, several studies highlighted that Chinese IPO's enjoy the world's highest initial returns. Among others, Mok and Hui (1998), Tian (2003) Chan et al. (2004) and Larry et al. (2008) report underpricing ranging between 100-300 per cent. These levels are much higher than the average level of 60 per cent in other emerging markets (Jenkinson and Ljungqvist, 2001). For example, Yong and Isa (2003) report an average initial yield of 80.3 per cent for Malaysian IPOs over the period 1980-1991. More recently, Agarwal et al. (2008) find average initial returns of 20.8 per cent for Hong Kong IPO's. Finally, Kiyamaz (2000) documents an average 13.6 per cent underpricing over the period 1990-1995 for a sample of Turkish IPO's.

This paper extends the international literature on IPO's by examining the IPO's on the Tunis Stock Exchange (TSE), a frontier market characterized by high information asymmetry, low information efficiency, thin trading and the presence of "noise" traders. This study thus sheds light on the determinants of IPO's in an insufficiently investigated context. In fact, a limited number of studies have examined IPO's underpricing on the context of frontier market. Particularly, on the TSE most

of the conducted studies have highlighted the phenomenon without explaining it. For instance, Ben Naceur and Ghanem (2001) find an average underpricing of 27.8 per cent for issues conducted over the period between 1990 and 1999. Gana and Ammari (2008) studied the incidence of shares transfers by the original shareholders on the degree of the initial underpricing. Using a sample of Tunisian candidates companies over the 1992-2006 period, they find an initial underpricing of about 19.2 per cent, which mainly depends on the original and controlling shareholders.

In this paper, we examine the main determinants of initial IPO's performance based on a sample of 34 IPO's listed on the Tunisian Stock Exchange (TSE) over the period 1992-2008. We find an average initial return of about 16.0, 16.8 and 17.8 per cent respectively for the first, second and third day of trading. The level of underpricing is related to retained capital, underwriter's price support, oversubscription, listing delay and the offer price. Age of the firm, its size and the size of the offer do not seem to reduce the amount of money left on the table by issuers. The results of the regression remain unchanged after controlling for the presence of institutional investors and the existence of liquidity contract.

The remainder of this paper is organized as follows. Section 2 provides a brief description of Tunisian equity market. Evidence on short run underpricing is presented in the section 3. Section 4 investigates the determinants related to the level of short term underpricing and discusses the results of the analysis. The final section presents the conclusion.

2. THE IPO MARKET IN TUNISIA

The Tunis Stock Exchange (TSE) was established in 1969. During the first three decades, the Tunis stock market has not played a significant role in funding private growing companies. Since then, several reforms were undertaken mainly during the 1990s aimed at developing the market financing of the economy.

As in most emerging markets, the TSE had imposed ceilings since 1994. The purpose of this regulation is to protect the stock market and the investors from market irregularities and from speculative attacks that might be caused by the vulnerable environment of this emerging market. The regulation was first applied to all the stocks from their first day of trading. The listed stock prices can fluctuate between ± 5.0 per cent¹. When a stock price reaches the ceiling of ± 5.0 per cent, the stock price is fixed until the demand and the stock price falls below $+5.0$ per cent or the supply and the stock price rises above -5.0 per cent at the same day. However, we have noted varying levels of the margins of fluctuations in the TSE across the years, particularly for the first days of trading. Ceiling was sometimes removed during the first three days of new firm listing. In other circumstances, the ceilings were increased to ± 18.0 per cent for the three first days of trading. These changes aimed at allowing the market to freely evaluate the price of the newly introduced shares; especially it may impact the underpricing for the first day.

To be listed in the main market, the company must free float at least 10 per cent of its outstanding share capital to the public² with a minimum of 200 shareholders³. The listed firm must have at least two years of profit and at least one dividend paid.

The approval process is lengthy. Listing of already existing firms (ordinary procedure), or new public issues (offers for sale and beading procedure) are the three recognised methods for IPO's in Tunisia. An application is submitted for approval to the Tunisian Financial Market Council (FMC) after a firm and its underwriter has agreed on the price of the issue. The FMC evaluates the company, examines its forecast profits and the quality of its internal controls and its information disclosure. Once the FMC have approved the application, a prospectus is filled by the issuer, the underwriter and an independent auditor. The prospectus must include detailed historical financial accounting

¹ $\pm 3\%$ for the less liquid shares.

² Individual investors with a maximum participation of 0.5% and institutional investor having less than 5% of the capital.

³ Before 2005, the free float was set to a minimum of 20% and the number of public shareholders to 500.

information about the firm, along with details on the company's operating history, management team, prospects, risks, uses to which the new issue monies will be applied, its controlling shareholders and its subsidiaries. The final share issue price is set by the underwriter (pricer) and is announced to the public.

The mechanism for allocating IPO shares in Tunisia is done through a quotas procedure. Issuing firms and underwriters distribute shares randomly and equally across application orders collected in the subscription period. However, in recent years shares are often classified into different categories: institutional investors, foreign investors, and local subscribers. Each category is allocated a pre-specified percentage of the issued shares in order to ensure a better diffusion of the shares amongst various categories of shareholders and hence to reduce underpricing and speculation.

Table 1 exhibits the number of listed companies and market capitalisation in Tunisia from 1990 to 2008. The number of listed firms increased from 13 firms (mostly from the financial sector) in 1990 to 52 firms in 2008. Following the privatization program initiated by the Tunisian government during the 1990s going public was used also as a process of privatization for the state owned enterprises.

Table 1
Number of listed companies: 1990-2008

	1990	1995	1999	2002	2003	2004	2005	2006	2007	2008
Number of listed companies	13	26	44	46	45	44	45	48	51	52
Capitalisation in million dinars ⁴	448	3967	3326	2842	2976	3085	3840	5491	6527	6063

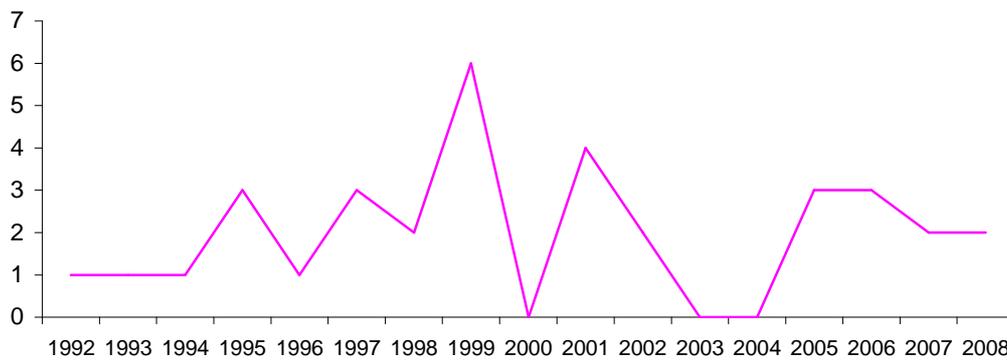
Source: TSE and BVMT annual reports

The number of IPO's varied sharply across the period 1992-2008 (figure 1). The year 1999 recorded the highest number of listings, with 6 newly public offerings. This is mainly due to the privatization of four state owned companies following the commitment of the Tunisian government move toward

⁴ Over the period 1990-2006, the Tunisian Dinar (TND) has ranged from 1 USD to 0.8 USD.

a market-based economy. The lowest figures are exhibited by the years 2000, 2003 and 2004 with no IPO's. For the year 2000, this may be due to the large number of IPO's conducted in 1999. On the other hand, it seems that due to unfavourable market conditions (crisis of confidence and of liquidity) no new public offerings were recorded for the years 2003 and 2004.

Figure 1: Number of listing by year (1992—2008)



3. SHORT RUN UNDERPRICING

3.1 Data and methodology

The sample consists of 34⁵ new listings of ordinary shares which are accompanied by the selling of shares⁶, on the Tunisian stock exchange from the January 1992 to December 2008. Post-IPO performance data (on the closing prices and the market Index) are obtained from the TSE online database (www.bvmt.com.tn). Only Batam, a retail company, was de-listed due to bankruptcy in 2002. This does not alter our analysis given that the company was first listed in 1997, five years before delisting.

⁵ We considered only the IPO motivated by opening capital decision

⁶ IPO's with no selling of shares are excluded (ordinary procedure).

Consistent with previous studies (Aggarwal et al., 1993; Chi and Padget, 2005), we use the following methodology to measure the underpricing of IPO's. The return of stock i at the end of the first trading day is calculated as:

$$R_{i1} = \frac{P_{i1}}{S_{i0}} - 1 \quad (1)$$

where P_{i1} is the closing price of the stock i on the first trading day, and S_{i0} is the subscription price and R_{i0} is the raw first-day return on the stock.

As the issue price of the share i is fixed at the prospectus date, the return between the price at the end of the first day's trading and the issue price will depend, in part, on changes in market conditions facing companies.

To account for the impact of the substantial delay between pricing and listing, underpricing is measured as the market-adjusted abnormal return for each IPO on the first trading day and it is computed as:

$$MAR_{m1} = R_{i1} - R_{m1} \quad (2)$$

The return on the market index at the same time period is:

$$R_{m1} = \frac{P_{m1}}{P_{m0}} - 1 \quad (3)$$

where P_{m1} is the closing market index value on first trading day, P_{m0} is the closing market index value on the last day of subscription period of the IPO, and R_{m0} is the first day's comparable market return.

In this study, we use the BVMT index (the market capitalisation weighted index for the TSE) as a proxy for the market index.

As expressed in (2), the market adjusted abnormal return MAR_{m1} supposes that the systematic risk of the IPO's is equal to one. A number of studies (Ibbotson, 1975; Spiess and Affleck-Graves, 1995) demonstrate that the average beta of newly listed firms is higher than the systematic risk of the

market portfolio. Thus, this measure of the abnormal return provides a somehow upwardly biased estimate on the initial performance of the IPO relative to the market.

To account for the ceiling imposed on trading at the TSE, several short-run returns are computed in order to capture the effective underpricing MAR_{mt} ($t=1, 2, 3$) in an analogous manner to MAR_{m1} ⁷.

As noted by Ljungqvist et al. (2006), it seems appropriate to measure the underpricing over a longer window in less developed markets where aftermarket prices may take more to reach equilibrium.

3.2. Results on short run underpricing

We now proceed to apply the methodology outlined above to estimate the return of the IPO in our sample. Table 2 reports summary descriptive statistics of underpricing for the 34 IPO's conducted during the period 1992-2008. The degree of underpricing in the sample ranges from -4.4 per cent to 65.0 per cent. The average initial return amounted 16.0 per cent, 16.8 per cent and 17.8 per cent respectively for the first, second and third trading day. This underpricing is significantly different from zero at the 1 per cent level, for all cases. The percentiles exhibit the same patterns for MAR1, MAR2 and MAR3, confirming the underpricing. On the other hand, the median in all cases is lower than the mean, which indicates that the series of initial returns are skewed to the right.

Our results are very close to those obtained by Gana and Ammari (2008), who reported initial underpricing of about 19.2 per cent for the sample of IPO's listed from 1992 to 2006. Yet, these results contrast somewhat with those found by earlier studies examining short run underpricing of IPO's of the TSE. For instance, Ben Naceur and Ghanem (2001) reported a short run underpricing of 27.8 per cent over a longer period from 1990 to 1999.

⁷ We calculate also the underpricing for the days four to 10 after listing. We note that beyond the 3rd day of listing, underpricing remains relatively flat and stable. Hence, in the remaining of this work, we limit the analysis to the first three days after listing.

Table 2
descriptive statistics of MAR of the 1st, 2nd and 3^d day (1992-2008)

	Min	Max	Mean	Median	SD
MAR 1	-0.044	0.640	0.160	0.108	0.172
MAR 2	-0.048	0.607	0.168	0.110	0.168
MAR 3	-0.033	0.650	0.178	0.113	0.181
Percentiles	10%	25%	50%	75%	90%
MAR 1	0.0024	0.0296	0.1087	0.2484	0.3909
MAR 2	0.0024	0.0297	0.1087	0.2484	0.3909
MAR 3	0.0048	0.0439	0.1137	0.2819	0.5012

Source: authors' calculations

Table 3 reports the mean short-run underpricing (MAR) respectively of the first, second and third day for each year. The highest underpricing is exhibited by the IPO's of the year 2005 (32.2 per cent). The lowest figure is recorded in 1993 (0.2 per cent).

The analysis of these results suggests the existence of two sub-periods. The first sub-period includes the period 1992-1998 and the year 2002 with low levels of underpricing. For 1992-1998 period, this weak underpricing can be attributed to the fact that the stock market was not well developed and known by the public. For 2002, the poor short-term performance of IPO's can be explained by the impact of the year 2001 (due especially to geopolitical tensions). The second sub-period includes the years 1999, 2001 and the period 2005-2008. This high level of performance during these years may be explained by the outstanding performance of the Tunisian economy and by the growing interest of international investors to the TSE since 2005.

Table 3
Summary of MAR characteristics by introduction year

Year	MAR 1	MAR 2	MAR 3
1992	0.054	0.082	0.109
1993	0.002	0.004	0.006
1994	0.030	0.049	0.078
1995	0.029	0.047	0.056
1996	0.009	0.009	0.008
1997	0.041	0.043	0.047
1998	0.084	0.103	0.11
1999	0.239	0.2411	0.268
2000	-	-	-
2001	0.227	0.261	0.312
2002	0.038	0.036	0.041
2003	-	-	-
2004	-	-	-
2005	0.322	0.300	0.291
2006	0.196	0.194	0.165
2007	0.305	0.291	0.305
2008	0.197	0.231	0.197
Total	0.1607	0.1683	0.1783

Source: authors' calculations

We also examined the frequencies of the firms exhibiting underperformance (positive abnormal returns) and those exhibiting negative abnormal returns. It appears that for the first day, 91.2 per cent of the 34 issuing firms were underpriced. For the second and the third day only 5.9 per cent recorded negative returns.

4. EXPLAINING SHORT RUN UNDERPRICING

A number of theories and explanations of IPO underpricing have been put forward and tested against the data of various stock markets. Some models exploit the information asymmetry hypotheses, since underpricing is needed to reduce the informational gap between the different parties (Rock, 1986; Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989 and Welch 1989). Other models suggest that the level of underpricing is related to the uncertainty surrounding the IPO outcomes around listing (Beatty and Ritter, 1986; Carter and Manaster, 1990 and Megginson and Weiss, 1991). Finally, signalling models suggest that good firms use the underpricing to signal their

quality in order to raise funds in the future with more favourable conditions through seasoned equity offerings (Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989 and Brennan and Franks, 1997). However, no single theory can explain the initial performance of newly listed firms during the first days of trading (Jenkinson and Ljungqvist, 2001; Ritter and Welch, 2002).

To examine the determinants of short-run underpricing in the TSE, we investigate various explanations proposed by previous research. The variables examined include the retained capital, underwriter price support, oversubscription rate, listing time, offer price, age of the issuing firm, size of the issuing firms, and size of the issue.

Data used are collected from two sources: the FMC and the TSE. We collect information's on IPO firm characteristics around the listing period and relating to the operation of introduction itself. All these information's are collected from hard copies of prospectus published by the issuers and available at the FMC documentary service⁸ and from the *Bulletin Officiel* of the TSE.

4.1. Literature and hypothesis

Retained capital

The relation between the level of the retained capital insiders and the firm value has been highlighted by many authors (Downes and Heinkel, 1982; Allen and Faulhaber, 1989). From an agency theory point of view, a high level of retained capital serves to align the interest of firm owners (managers) with those of new shareholders. This will lead to a higher value of the firm (Jensen and Meckling, 1976). Furthermore, firms with a diffuse capital structure observe more earning management than more concentrated firms, which reduce the cash flows and consequently the firm value (Ritter, 1984). On the other hand, the more the owners/executives are confident on the future perspectives of the IPO firm the more they will retain a high proportion of capital. Thus, the level of retained capital by

⁸ Since 2005, electronic copies of IPO prospectus are available online cmf.org.tn.

existing owners will send a signal to the potential investors about the true value of the firm. This will contribute to lower the underpricing as the company is able to set higher price for the offer (Mroczkowski and Tanewski, 2004).

However, high levels of retained capital may be associated with higher risks of cash flow minority rights expropriation (Bozzolan and Ipino, 2007). In such circumstances, potential investors will only buy the share when it is severely underpriced.

Underwriter price support

Early studies relate underwriter reputation to initial underperformance of IPO's and document a negative relationship (Logue, 1973; Beatty and Ritter, 1986; Johnson and Miller, 1988). This view is also confirmed by more recent works (Booth and Chua, 1996; Johnson and Miller, 1988; Kim and Ritter, 1999; Chang and al, 2008). This stems from the fact that prestigious underwriters will reduce agency costs experienced by firms around IPO. On the other hand, firms with favourable information tend to choose high quality underwriters to signal the quality of the new issue (Titman and Trueman, 1986). Others attribute this negative relationship to the certification role played by reputable underwriters. In fact, they contribute to reduce information asymmetry between owners and potential investors.

However, underwriter's reputation might be associated with high level of underpricing. In fact, they are likely to care more about the perceived reputation amongst potential investors, which seek to realize benefits and with whom underwriters may maintain ongoing relations (Spiess and Pettway; 1997). On the other hand, as noted by Loughran and Ritter (2002), reputable underwriters may be forced to severely underprice due to the increasing of financial analyst coverage of IPO's.

As noted by several authors, underwriters may be motivated to support share prices after the firm going public, as they are concerned by their own reputation they will support IPO's with low

performance (less than the average) after listing (Schultz and Zaman, 1994). Empirically, evidence of price support is documented by Ruud (1993), Hanley (1993) and Schultz and Zaman (1994) on the NYSE and by Xu and Wu (2002) on the Shanghai Stock Exchange.

In this study, we don't examine the impact of reputation due to the lack of information and to the relative short experience of the majority of underwriters which prevented us from adequately assess their prestige. However, in the TSE evidence of price support by underwriters are widely reported by both professionals and investors. In order to account for the variable reputation, we constructed a dummy variable taking the value of one if the underwriter is known to support its own IPO's and 0 otherwise. To classify the underwriters, we surveyed 10 financial professionals and we asked them to classify underwriters in two groups: price supporters and no price supporters. The classification led to consider two underwriters as belonging to the first group.

Oversubscription rate

Theoretically, the demand for the IPO, proxied by the oversubscription ratio, is considered to positively impact the level of underpricing. Michaely and Shaw (1994) argue that the level of underpricing depends on the information heterogeneity amongst investors. Based on the Rock's 'winner curse' model (1986), they show that underpricing is more needed with the decrease of information homogeneity. They assume that the level of heterogeneity increases with the demand for the firm's shares, as both informed and uninformed will bid in "good" IPO's, whereas "bad issues" attract only uninformed investors. Alternatively, Chowdhry and Sherman (1996) argue that potentially highly underpriced IPO's may attract more investors looking for high potential capital gains. They explain that when price is disclosed before the end of biddings, it is likely that a substantial information leakage take place, which leads to an increase in the demand for the firm's shares, particularly when investors realize that the offer price is low.

Empirically, several authors used the oversubscription rate to explain the magnitude of the first listing day abnormal returns of IPO's (Allen and Faulhaber, 1989; Chowdhry and Sherman, 1994; Booth and Chua, 1996). Hanley (1993) find a positive relationship between the subscription ratio and the magnitude of the initial performance on a sample of American IPO's. Kandel et al. (1999) find similar results on the Tel Aviv Stock Market. Agarwal et al. (2008) examine a sample of IPO's on the Hong Kong Stock Market and find a positive relationship on the short run but a negative association on a longer horizon. They explain these results by investor's overreaction on the short run.

Listing time

According to Chowdhry and Sherman (1996), the listing delay affects the underpricing level. On one hand, longer time of listing is associated with more uncertainty on the offer. On the other hand, before listing, there are no share price signals and investors must be compensated for this high level of illiquidity with share pricing discounts. When a firm takes too long to be listed, the market may revise its expectations about the future value of the firm and hence impact the subsequent level of underpricing. Mok and Hui (1998) and Su and Fleischer (1999) find a positive relationship between the average initial returns of IPO's and the listing time for the Shanghai Stock Exchange. Megginson and Tian (2006) find that one day's delay of the flotation increases the initial returns by 0.4 percent in China. They argue that this may be explained by the unusual long delays of listing in China (over 10 months).

However, the time lag of listing can be attributed to an unintended underpricing that is not wanted by the issuer. This argument is first highlighted by Uddin (2008) who advocates that to the extent that the listing delay is not known to the issuers, it seems hard to believe that they will intentionally lower the offer price.

In the TSE, the delay between the closing of the offer and the listing is mainly due to the type of offerings (direct registration, minimum price, firm price, open price) and to regulatory clearances and controls. Referring to the specific case of the Tunis Stock Exchange, it is obvious that any relation between listing delay and underpricing is more likely to be unintended, as there is no ex post information about how long it will take an IPO to be listed. It appears also that, as the delay of listing gets longer, investors are discouraged to trade actively in the market. This will reduce their irrationality and hence the aftermarket performance of the IPO.

Offer price

The initial price of an IPO offering may also indicate the extent of underpricing although its level seems to have little economic significance (Fernando et al., 1999). Firms do not set the offer price in an arbitrary way. In fact, when the aim of the IPO is to encourage the participation of the retail investors, the issuers set a relatively low price to encourage potential small investors. This will systematically lead to an excessive demand for the security and hence larger underpricing. Besides, Daily et al. (2003) suggest that higher offer prices are associated with lower uncertainty regarding the future performance of the firm.

Conversely, firms looking to attract institutional investors tend to set high offer prices. In fact, institutional are known to avoid low price shares (Gompers and Metrick, 1998). The presence of institutional might lead to higher underpricing as they need to be compensated for the valuable information they provide to better marketing the IPO (Benveniste and Spindt, 1989). Furthermore, Jain and Kini (1999) argue that a low offer price may indicate little demand, little value, or both and hence are associated with lower short-term performance.

Empirical evidence provides mitigated results regarding the relation between the offer price and underpricing. Ibbotson et al. (1988) find that firms offered with very low prices usually record high

levels of underpricing. They argue that low priced-offers exhibit higher risks and are subject to speculative trading. Fernando et al. (1999) report a U-shaped association.

Age of the issuing firm

Age of the firm is hypothesized to have a negative impact on the level of underpricing following the IPO. First, newly created firms, as opposed to old ones, exhibit higher ex-ante uncertainty. This is due to the fact that less-seasoned firms are less likely to have been followed by financial analysts (and so well assessed) as they do not have enough historical published financial data. Second, the availability of information on firms operating for several years contributes to reduce the information asymmetry around the IPO (Ritter, 1984 et 1991; Hensler et al., 1997). This uncertainty about the future perspectives of the candidate company will be reflected in higher underpricing (Bilson et al., 2003).

Size of the issuing firms

The size of the firm is usually negatively associated to its risk. Larger firms have better access to investment capital, have more diversified products lines, are well monitored and have better access to resources crucial for firm profitability and survival (Finkle, 1998). These factors contribute to reducing the uncertainty around the IPO of large firms for potential investors (Kiyamaz, 2000; Bhabra and Pettway, 2003). However, the inverse relation between risk and firm size is robustly supported in many studies (Titman and Wessels, 1988; Schultz, 1993). Empirically, several studies have reported a negative link between firm size and short run underpricing (Ibbotson et al., 1994 ; Carter et al., 1998).

Size of the issue

The size of the IPO offer measured by the total gross proceeds raised from the market is supposed to be negatively related to the underpricing level. According to Miller and Reilly (1987), Clarkson and Simunic (1994), the size of the offerings indicates the uncertainty about IPO firms. Larger IPO's are usually offered by well known firms with several operating years and better records. This contributes to reduce the perceived risk of the IPO from the side of potential investors (Carter et al., 1998 ; Jain and Kini, 2000). Carter and Manaster (1990) document that, besides the uncertainty surrounding the IPO, investors will take into account its size to value the performance of IPO's.

Empirically, several studies report evidence for this negative relationship between the amount of raised funds and the level underpricing (Chalk and Peavy, 1990 and Clarkson and Merkley, 1994).

4.2. Variables used

All variables used in our study are summarized in table 4.

Variables	Proxies	Measure	Expected sign
Retained Capital	Capret	1-percentage of shares raised to total outstanding shares	+/-
Underwriter's price support	UndPS	Dummy variable taking one if the underwriter is known to support its own IPO's and 0 otherwise.	+/-
Oversubscription ratio	Over	The number of demanded shares over the number of shares offered	+
Listing delay	Del	The number of days separating the closing of subscriptions and the first day of trading	+
Offer price	Price	The natural logarithm of the price set by the issuer	-
Firm age	Age	The natural logarithm of the number of years between the year of creation and the IPO	-
Firm size	FSize	The natural logarithm of total assets at the end of the year preceding the IPO of the issuing firm	-
Offer size	OSize	The natural logarithm of the number of offered shares * offer price	-

The characteristics of the main variables used in this study are reported in table 5. The retained capital for the 34 offered shares averages 76.1 per cent, with a minimum of 51.0 per cent and a maximum of 90.0 per cent. Oversubscription averages 4.5 for our sample, with a minimum of 0.6 and a maximum of 18.6. These levels are comparable to oversubscription rates observed in other developed and emerging markets. In our sample of 34 IPO's, firms take in average 18 days to be listed. The listing delay varies across IPO's ranging from a minimum of four days to a maximum of 56 days. The average price for the Tunisian IPO's is 15.75 dinars⁹, the minimum offer price is 2.55 dinars and the highest price was set to 43 dinars. Among professionals, a price less than five dinars is considered to be a low price, whereas a share offered above 20 dinars is considered to be very high. The average and the median age of firms which conducted IPO's in the TSE are about 22 years. The minimum number of years of operation is one year and the maximum is 77 years. It seems also that in recent years, the IPO market attracted well established firms with long experience and mature organisations. The average total asset is 27.9 million dinars, with a minimum of 0.98 and a maximum of 80.9. The sample is dominated by medium size companies (half of IPO firms with less than 30 million dinars total assets). The total funds raised by firms listed in the TSE averaged 8.7 million dinars. The minimum gross proceeds amounted 0.75 and the highest capital raised 43.6 millions. This relatively small amount of raised funds, compared to other international emerging markets, is due to the low capitalisation level of IPO candidate companies and to the fact that Tunisian companies are historically bank oriented. However during the last years gross proceeds from IPO's reached higher levels with more than 43 million dinars raised from the market for each of the two IPO's conducted during the year 2008.

⁹ One Tunisian dinar ranged between 0.8 to 1 USD over the study period.

Table 5**Summary of IPO sample characteristics**

	Mean	Median	Min	Max	SD
Capret	0,76	0,73	0,51	0,90	0,10
Over	4,52	3,50	0,61	18,61	4,30
Del	18,38	17,00	4,00	56,00	10,51
Price	15,75	15,00	2,55	43,00	8,95
Age	21,94	21,50	1,00	67,00	15,58
FSize*	65,3	27,9	0,98	80,9	141,2
OSize*	8.7	5.5	0.75	43.6	10.2

Capret is the retained capital, **Over** is the oversubscription ratio measured by the number of demanded shares over the number of shares offered, **Del** is the listing time calculated as the natural logarithm of number of days separating the closing of subscriptions and the first day of trading, **Price** is calculated as the natural logarithm of the offer price by the issuer, **Age** is the issuing firm age measured as the natural logarithm of the number of years between the year of creation and the IPO, **FSize** is the firm issuing size measured by the total assets at the end of the year preceding the IPO of the issuing firm, and **OSize** is the funds raised measured by the number of offered shares x offer price.

* In millions of dinars (approximately 1 TND = 0.85 D)

The correlation matrix of the variables used is presented in Table 6. Parametric and nonparametric correlation matrix show no correlation between different explanatory variables

Table 6
Parametric and non parametric correlation matrix

	Capret	Over	IDel	lPrice	lAge	FSize	OSize
Capret	1.00	0.20	-0.01	-0.06	-0.19	0.21	-0.09
Over	0.22	1.00	0.10	-0.23	0.16	0.27	0.26
IDel	-0.09	0.21	1.00	0.23	0.06	-0.15	0.09
lPrice	-0.05	-0.37*	0.33	1.00	0.18	-0.17	-0.09
lAge	-0.08	-0.02	0.04	0.20	1.00	0.06	0.31
FSize	0.24	-0.01	-0.26	-0.06	-0.08	1.00	0.23
OSize	-0.12	0.10	0.03	-0.03	0.28	0.27	1.00

Capret is the retained capital, **Over** is the oversubscription ratio measured by the number of demanded shares over the number of shares offered, **IDel** is the listing time calculated as the natural logarithm of number of days separating the closing of subscriptions and the first day of trading, **lPrice** is calculated as the natural logarithm of the offer price by the issuer, **lAge** is the issuing firm age measured as the natural logarithm of the number of years between the year of creation and the IPO, **FSize** is the firm issuing size measured by the natural logarithm of total assets at the end of the year preceding the IPO of the issuing firm, and **OSize** is natural logarithm of the funds raised measured by the number of offered shares x offer price.

4.3 Econometric model and empirical results

We use multiple linear regression models to examine the determinants of IPO underpricing. The dependent variable is the market-adjusted initial return.

The regression model retained is as follow:

$$MAR_{mi} = \beta_0 + \beta_1(capret) + \beta_2(undrep) + \beta_3(over) + \beta_4(ldel) + \beta_5(lprice) + \beta_6(lage) + \beta_7(Fsize) + \beta_8(Osize) + \text{control variables} + \varepsilon \quad (4)$$

where MAR_{mi} is the degree of short run underpricing for $i=1, 2$ and 3 (market adjusted initial returns of IPO), **Capret** is the ownership retained, **Over** is the oversubscription ratio measured by the number of demanded shares over the number of shares offered, **IDel** is the listing time calculated as

the natural logarithm of number of days separating the closing of subscriptions and the first day of trading, **IPrice** is calculated as the natural logarithm of the offer price by the issuer, **IAge** is the issuing firm age measured as the natural logarithm of the number of years between the year of creation and the IPO, **FSize** is the firm issuing size measured by the natural logarithm of the total assets at the end of the year preceding the IPO of the issuing firm, and **OSize** is the funds raised measured by the natural logarithm of the number of offered shares x offer price.

Two control variables are also introduced: **cliq** is a dummy variable taking one if there is a liquidity contract in the IPO and 0 otherwise, and **inst** is a dummy variable taking one if there is a part of IPO reserved to institutional and 0 otherwise.

We regress the initial returns measures on all explanatory variables supposed to affect the IPO underpricing in Tunisia. The regression models use the market adjusted returns for the three first days of trading (MAR_{mi}) of all 34 IPO's. Table 7 presents the results of coefficient estimates.

Table 7
Determinants of underpricing

	MAR 1				MAR 2				MAR 3			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Coef	Prob										
Capret	-.393	0.017**	-.392	0.019**	-.371	0.020**	-.371	0.022**	-.408	0.018**	-.411	0.020**
UndPS	.223	0.000***	.220	0.000***	.218	0.000***	.216	0.000***	.206	0.001***	.210	0.001***
Over	.004	0.186	.005	0.115	.007	0.037**	.008	0.022**	.008	0.043**	.009	0.033**
Ldel	.102	0.006***	.103	0.005***	.095	0.013**	.096	0.010***	.128	0.014**	.125	0.012**
Lprice	-.086	0.014**	-.090	0.013**	-.075	0.030**	-.080	0.023**	-.081	0.025**	-.091	0.017**
Lage	-.021	0.422	-.022	0.380	-.029	0.256	-.031	0.221	-.030	0.239	-.038	0.183
FSize	-.006	0.624	-.005	0.612	-.009	0.462	-.008	0.459	-.012	0.402	-.009	0.487
OSize	-.011	0.507	-.003	0.882	-.008	0.641	-.000	0.995	-.023	0.258	-.019	0.450
Cliq	-	-	.001	0.972	-	-	-.008	0.864	-	-	-.050	0.333
Inst	-	-	-.041	0.554	-	-	-.037	0.557	-	-	-.009	0.880
Const.	0.671	0.081	.553	0.217	.659	0.083	.552	0.211	.911	0.040	.889	0.072
R²	0.7050		0.7133		0.7074		0.7176		0.6760		0.6947	

MAR_i is the degree of short run underpricing for $i=1, 2$ and 3 (market adjusted initial returns of IPO), **Capret** is the retained capital, **Over** is the oversubscription ratio measured by the number of demanded shares over the number of shares offered, **IDel** is the listing time calculated as the natural logarithm of number of days separating the closing of subscriptions and the first day of trading, **IPrice** is calculated as the natural logarithm of the offer price by the issuer, **IAge** is the issuing firm age measured as the natural logarithm of the number of years between the year of creation and the IPO, **FSize** is the firm issuing size measured by the natural logarithm of total assets at the end of the year preceding the IPO of the issuing firm, and **OSize** is natural logarithm of the funds raised measured by the number of offered shares x offer price.

* In millions of dinars (approximately 1 TND = 0.85 D), **cliq** is a dummy variable taking one if there is a liquidity contract in the IPO and 0 otherwise, and **inst** is a dummy variable taking one if there is a part of IPO reserved to institutional and 0 otherwise.

*, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

The regression results show that retained capital (Capret), underwriter price support (UndPS), delay listing (IDel) and offer price (IPrice) are statistically significant and have the expected signs for all initial return measures (MAR 1, 2 and 3). The estimated coefficient for the variable oversubscription rate is positive and statistically significant for MAR 2 and MAR 3. The other explanatory variables

(firm age, firm size and the size of the issue) do not seem to have any impact on the level of underpricing.

The fraction of capital held by the controlling shareholders (Capret) is negatively correlated with underpricing. This result is consistent with both the “agency costs” and the “signalling” hypothesis. However we privilege the signalling hypothesis channel. In fact, the Tunisian exchange market is characterized by both a high level of informational asymmetry and a lack of transparency. In such circumstances investors lean mainly on side signals to assess the true value of the firm. Retaining capital by original owners is thus considered as a strong indicator of the future perspectives of the IPO firms. On the other hand, diffusing a high proportion of capital amongst small minority shareholders is often considered, by investors, as a mean to share risks (in the future) or disengage progressively from the firm.

Our results show also a strong evidence of underwriters’ price support. The coefficient estimate of the variable (UndPS) is significantly positive at the 1 per cent level. This result is consistent with the findings of Schultz and Zaman (1994) on the NYSE, Xu and Wu (2002) on the Shanghai stock exchange and Uddin (2008) on the Indian stock exchange. The result confirms the widespread view amongst professionals on the existence of price support practices on the TSE. We believe that price support practices are used by some brokers for mainly two reasons. First, they might be motivated by their “reputation” on the market as leading successful IPO’s. Second, due to the thinness of the Tunisian exchange market, underwriters as they also act as brokers gain money also from trading activities on the post-IPO market, they have incentives to support their own IPO’s to maximize their potential profit from other investors trading.

The demand for the firm’s shares seems to be positively related to the degree of underpricing. We believe that this positive coefficient estimate of the variable oversubscription indicates primarily the expectations of potential investors on the future sort-run performance of the IPO. The Tunisian

market is known to attract investors that participate in the stock exchange only during IPO's said to be "ipoers", whom are motivated by short run profits. They exploit information leakage made by institutional investors or more "strategic investors" to subscribe to highly underpriced IPO's.

The positive sign of listing delay (IDel) is consistent with the findings by Chowdhry and Sherman (1996) on the UK market and by Megginson and Tian (2006) on the Chinese market. However, we do not advance the same explanation as it is hard to advocate that candidate firm's intently underprice when listing delays get longer. We support the point view that underpricing is more likely to be unintended. In fact, listing delays lead to increased information leakage about the true value of the offered share. Rationed investors looking for short run profits, particularly "ipoers", will thus try to catch up and will add to the buy side pressure on post-IPO trading. This might lead to an overreaction of share prices during the first days of listing.

Our findings show a negative relationship between offer price (IPrice) and underpricing. This may be attributed either to higher demand for low price IPO's or to the lower uncertainty surrounding IPO'S offered at high prices. We tend to support the first explanation as price and oversubscription rate are negatively and significantly correlated (-0.37). Besides, when the offer price is low, subscribers are more likely to be rationed. This rationing will add to the pressure on the buy side in the post-IPO trading and will thus lead to an increase in the short run performance of offered share.

The other explanatory variables included in the regression do not seem to have any impact on the level of underpricing. This indicate that age, firm size and the offer size are not used by investors to assess the information asymmetry and thus to reduce ex ante uncertainty about the issuing firm.

Tunisian investors seem to rely mainly on side information (retained capital, underwriter, demand level and listing delay) rather than on companies characteristics disclosed on IPO's prospectus. On the contrary, Gasbarro et al. (2003) examining a sample of Mauritius IPOs find that information

disclosed in the prospectus, such cash flow and sales, positively impact the level of initial underpricing.

On one hand, this may be attributed to the presence of a high number of ipoers who are only interested in short run performance of the share. On the other hand, it appears that Tunisian investors are sceptical about the value of information disclosed on IPO's prospectus. In fact, firms, particularly in Tunisia, are known to intensively proceed to window dressing prior to going public.

To investigate the robustness of our results, we introduced two control variables to account for the possible impact of the participation of institutional investors in IPO's and the existence of liquidity contracts on the level of underpricing. First, the direction and significance of the coefficient estimates for the basic model (model 1) remain unchanged for the three measures of initial underpricing. Second, the presence of institutional investors does not seem to act as a sort of "certification" of the value of the company, reducing uncertainty and therefore producing a lower level of underpricing. Our results are inconsistent with those of Ljungqvist et al. (2006).

The existence of a liquidity contract is found to be unrelated to the level of underpricing indicating that providing a protection against market illiquidity does not contribute to reduce ex ante uncertainty and hence to lower the amount of the money left on the table by issuing firms.

5. CONCLUSION

This paper examined the initial underpricing for a sample of 34 Tunisian IPO's from the period 1992-2008. Besides the presence of ceiling constraints it appears that the level underpricing is captured over the first three days of trading. The average initial return is about 17.8 per cent (for the third day). However, we highlighted varying level underpricing across the years. The average underpricing for the sample IPOs is comparable to other international studies but very different from those of the Chinese market.

We also examined the relation between the degree of underpricing and a set of exogenous variables hypothesized to impact the underpricing. Estimation based on multivariate regression analysis show that retained capital (Capret), oversubscription rate (Over), listing delay (IDel) and offer price (IPrice), significantly affect the underpricing level of the sample IPO's. It appears also that the Tunisian IPO market is dominated by irrational investors (Ipoers) who rely on side information and rumours to subscribe to potentially "good" IPOs. Our results highlight also a strong evidence of underwriter's price support (UndPS).

Finally, it seems that the participation of institutional investors to the IPO and the existence of liquidity contracts (two features of the Tunisian market) did not play any role in reducing the level of information asymmetry nor the uncertainty surrounding IPOs.

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