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The initial and aftermarket performance of IPOs in an emerging market: evidence from Istanbul stock exchange

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Abstract

This paper empirically analyzes the initial and after-market returns for the Turkish initial public offerings (IPOs) to provide an emerging market case of international evidence on performances of IPOs. The sample consists of 163 firms listed and traded on the Istanbul Stock Exchange during the period of 1990–1996. The results show that the Turkish IPOs are underpriced on initial trading day on average of 13.1%. The initial underpricing is 11.7% for industrial firms, 15% for financial firms and 17.6% for others. In terms of sub-sectors the highest return is obtained in Tourism/Transportation group, while the lowest return is observed in Machinery/Equipment group. With the exception of Banking group, all of the sub-sectors experienced statistically significant initial underpricing. The investigation of factors influencing the initial performance show that size of issuer, rising stock market between the date of public offering and first trading day, institutional ownership, and self-issued offerings are significant determinants of underpricing.

JEL classification: G14; G15; G24

Keywords: IPOs; Emerging markets; Istanbul stock exchange

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1. Introduction

Numerous studies have examined the performance of initial public offerings (IPOs) in several different markets. These studies document that the initial underpricing is a common phenomenon in every stock market, with the amount of underpricing differing from one market to another. The majority of studies include the equity markets of the US (Ibbotson, 1975; Ritter, 1984, 1991; Tinic, 1988; Peavy, 1990), UK (Keasey and Short, 1992; Levis, 1993), Canada (Jog and Riding, 1987; Jog and Srivastava, 1994), Switzerland (Kunz and Aggarwal, 1994), Australia (Lee et al., 1996a). There are relatively fewer studies on IPOs in the equity markets of developing countries. Among them, Lee et al. (1996b) investigates IPOs in Singapore; Kazantzis and Levis (1995) in Greece; Kim et al. (1995) in Korea, Aggarwal et al. (1993) in Chile, Mexico and Brazil; and Dawson (1987) in Hong-Kong, Singapore and Malaysia. These studies also report the existence of the initial underpricing in these markets.

This paper extends the international literature on IPOs by examining the IPOs at the Istanbul stock exchange (ISE). Specifically, both the initial and immediate after-market performances of IPOs are analyzed. Furthermore, the factors influencing the initial performances of IPOs are investigated by employing some of the explanations suggested in the IPOs literature.

The remainder of the paper proceeds as follows. In Section 2, literature on IPOs and the history of the ISE are briefly reviewed. While data and methodology are outlined in Section 3, the initial and after-market performances of IPO are presented in Section 4. The variables employed to explain underpricing phenomenon are defined in Section 5. The results of regression analysis are reported in Section 6, while the final section provides a summary and conclusion.

2. Background

2.1. Emerging markets IPOs evidence

The performances of IPOs are investigated extensively in several markets. A number of studies conducted in the US reports the existence of inital underpricing (Ibbotson, 1975; Aggarwal and Rivoli, 1990; Ritter, 1991). Ritter (1991), for example, reports an initial underpricing of 14.3%. The IPOs performances are also investigated internationally both in developed and developing stock markets. The existing studies show that the initial underpricing is common in every stock market. Ritter (1998) provides an excellent summary of the studies of IPOs around the world. Table 1 reports a summary of studies on the performances of IPOs in emerging markets. Among them, Dawson (1987) investigates both short- and long-run performance of IPOs in Hong Kong, Singapore and Malaysia during the period of 1978–1983. While Malaysian IPOs show the most extreme case of underpricing with 166.6%, the average underpricing in Hong-Kong and in Singapore are 13.8 and 39.4%, respectively.

Table 1
Summary of previous studies on performances of initial public offerings (IPOs) in developing markets

Study	Country	Sample period	Number of firms	Initial return (%)
Lee et al. (1996a)	Singapore	1973–92	132	31.4
Kazantzis and Levis (1995)	Greece	1987–91	79	48.5*
Kim et al. (1995)	Korea	1985–89	169	57.5*
Aggarwal et al. (1993)	Brazil	1980–90	62	78.5*
	Chile	1982–90	36	16.3
	Mexico	1987–90	37	33.0
Dawson (1987)	Hong-Kong	1978–84	21	13.8
	Singapore	1978–84	39	39.4
	Malaysia	1978–84	21	166.6

* Statistically significant at least at 5% level.

Aggarwal et al. (1993) examine the performance of 62 Brazilian (during 1980–90), 36 Chilean (during 1982–90), and 44 Mexican IPOs (during 1987–90). Results indicate that the initial day returns are 78.5, 16.3 and 2.8% for Brazil, Chile and Mexico, respectively. Kazantzis and Levis (1995) investigate IPOs in Greece with using a sample of 79 firms going public between 1987 and 1991. The results show that Greek IPOs are on average underpriced by 48.5%. Kim et al. (1995) examine Korean IPOs of 169 firms during the period of 1985–89. The results reveal that the Korean IPOs outperform seasoned firms with similar characteristics. Much of the overperformance takes place during the first month, and long-run performance of Korean IPOs is not statistically different from that of seasoned firms. Furthermore, the deregulation, taking place in 1988, has reduced the initial underpricing, but it had no impact on long-run IPO performance.

Lee et al. (1996a) investigate the initial and long-run returns for Singaporean IPOs during the period of 1973–1993. They report an initial return of 30%, which is positively related to the level of oversubscription and retained ownership. In the long-run, no significant underperformance is detected. Kiymaz (1997) analyses the factors affecting the performances of Turkish financial IPOs during the first 30 trading days highly significant determinants of the performances of financial IPOs.

In summary, the existing studies on the emerging market IPOs consistently find the presence of the initial underpricing. This paper aims to extend the IPOs literature on emerging markets geographically by investigating the performances of the Turkish IPOs in both the initial and immediate after-market periods.

2.2. History and structure of ISE

The ISE began its operation in 1986 and has been the only stock exchange in Turkey.[1] It has demonstrated a considerable growth since its establishment in 1986.

[1] The capital market in Turkey remained relatively underdeveloped mainly because of (a) protection from foreign competition, (b) that private firms are small and family owned, (c) that family controlled firms had no incentives to issue equity to raise capital, and (d) that loans were cheap, easily obtainable, especially if they were owned by their own bank.

The number of companies traded on the exchange climbed from 80 at the end of 1986 to 228 at the end of 1996. The National Market is the major component of the ISE. There are also Regional, New Companies, and Watch-List Companies Markets. Most of the firms (93.4%) are traded at the National Market.[2] The total market capitalization of the firms traded has increased from US$ 938 million at the end of 1986, to US$ 30.8 billion at the end of 1996. Another noticeable growth is observed in the trading value, which has sharply increased from only US$ 13 million in 1986, to over US$ 51 billion in 1995. The listing requirements for the securities presenting partnership are regulated by both the ISE and the Capital Market Board. To get the listing of a security at exchange, the following conditions are required: the number of shareholders must be above 100; at least 15% of the paid-in capital must have been publicly offered; at least 3 years must have elapsed since the incorporation date.[3] The exchange administration normally determines and approves a financial structure, which must be at a level to enable the company to carry out its activities. The firm is also required to show a profit in the previous 2 consecutive years.[4]

3. Data and methodology

Panel A of Table 1 shows the sample selection. The population of the study consists of 168 firms listed and subsequently traded on the ISE during the period of January 1, 1990 and December 31, 1996. From this total, five firms are excluded due to inadequate data, resulting in a sample of 163 firms. Panels B through D of Table 2 provide selected characteristics of IPOs. Panel B of Table 2 reports the distribution of IPOs and the gross proceeds by year. The highest number of IPOs is observed in 1990 with 34 IPOs, followed by 29 IPOs in 1995. Furthermore, the highest percentage (47%) of total proceeds is realized in 1990, followed by 16% in 1991. In terms of number of IPOs and the percentage of gross proceeds, 1990 seems to a dominant issue year in Turkish IPOs market.[5]

[2] At the end of 1996, 213 firms at National Market, 11 firms at Regional Market, one firm at New Companies Market, and three firms were traded at Watch-List Companies Market. Due to the fact that Regional Market, New Companies Market, and Watch-List Companies Market were launched after 1995, all companies are traded between 1986 and 1994 were in National Market.

[3] If at least 25% of the capital is held by more than 100 shareholders, this obligation is reduced to 2 years.

[4] For the investment companies, some of these requirements may be waived by the written permission of Capital Market Board.

[5] In order eliminate inflation induced bias, the total proceeds are expressed in terms of US dollar. The proceeds are converted into US dollar by using the exchange rate on the last day of the public offerings.

Table 2
Sample selection and characteristics

Panel A: Sample selection

Number of IPOs during 1990–1996 Period	168
Less: firms with incomplete data	5
Net usable firms	**163**

Panel B: Frequency of IPOs and gross proceeds by years

Years	No. IPOs	Gross proceeds (000) ($)	% of total
1990	34	1 128 180	47
1991	22	383 680	16
1992	12	80 037	3
1993	16	154 689	6
1994	25	272 908	11
1995	29	245 844	10
1996	25	146 497	7
Total	163	2 411 835	100

Panel C: Division of IPOs and gross proceeds by sectors

Sectors	No. IPOs	Gross proceeds (000) ($)	% of sectors	% of total
Industrials				55
Food/beverage	12	92 881	7	
Textile/apparels	23	174 885	13	
Paper/publishing	14	98 183	7	
Chemical/petroleum	12	292 032	22	
Mineral products	16	248 452	19	
Basic metal	6	31 779	3	
Machinery equipment	21	377 802	29	
Total	104	1 316 014	100	
Financials				41
Banking	10	713 473	71	
Insurance	7	76 870	8	
Leasing/factoring	8	48 939	5	
Holding/investment	21	154 743	16	
Total	46	994 025	100	
Others				4
Trade	8	54 752	54	
Tourism/transportation	6	47 044	46	
Total	14	101 796	100	
Total	**163**	**2 411 835**		**100**

Panel D: Other characteristics of sample

	No. firms	% of total
Privatized IPOs	15	9
Non-privatized IPOs	148	91
Self-issued IPOs	30	18
Other IPOs	133	82
Sale of new issues	51	31
Sale of existing shares	112	69

Panel C of Table 2 reports the division of IPOs among sectors and the division of proceeds by sectors. Of the 163 IPOs, 104 IPOs are classified as industrial, 46 IPOs as financial, and the remaining 14 IPOs as others. In the industrial sector, Textile group is in the first place with 23 IPOs, followed by 21 IPOs in machinery/equipment, in financial sector holding/investment group is in the first place with 21 IPOs followed by banking group with ten IPOs. In terms of the gross proceeds, while machinery/equipment group takes the first place with 29% of the gross proceeds in the industrial sector, the banking group has the first place in financial sector with a share of 71%.

Panel D of Table 2 provides other information regarding to the sample. Out of 163 IPOs, 15 (9%) are IPOs taking place under the privatization program, 30 (18%) are the self-issued IPOs, and 51 (31%) IPOs involve with the issuing new shares.

All share price data, date of going public, offer price, offer size, and other firm specific information are obtained from the ISE.[6]

For each initial public offering, two short-run measures of performance are calculated:

(1) *The initial underpricing:* while the initial raw return for each stock is defined as relative price change from offer price to closing price at the end of first trading day, the initial adjusted return is defined to be the initial raw return less the corresponding market return on initial day.

(2) *The aftermarket returns:* the after-market adjusted return for each stock is defined as relative price change from closing price at the end of first trading day to closing price at the end of second day less the equivalent change in market return and so on.[7]

4. Initial and after-market performances of IPOs

The initial and immediate after-market adjusted daily average abnormal returns (AARs) are reported on Table 3. The initial market adjusted returns are 13.1% for all firms. While the industrial sector experiences a market adjusted return of 11.7%, the financial sector has a return of 15%, and the others have a return of 17.4%. These returns are statistically significant at 1% level. In terms of sub-sectors, the highest return is obtained in tourism/transportation group (25.4%); followed by paper/publishing (16.6%); and holding/investment (15.2%). Market adjusted returns are statistically significant for all sub-sectors with the exception of banking group, which experiences an insignificant market adjusted return of 20.9%.

[6] The total return for stock i in the period t is calculated as follows: $R_{it} = P_{it}/P_{i0} - 1$ where $P_{i,t}$ is the price of stock i at time t and $P_{i,0}$ is the offer price. The return on the ISE-Composite Index is calculated the same way.

[7] Standard event methodology is applied to calculate the average abnormal returns and the cumulative abnormal returns for n firms in each sectors and sub-sectors. Standard event methodology is not spelled out here.

Table 3
Initial and immediate after-market average abnormal returns (AARs) (%)

Sectors	Firms	Initial mkt. adj. Returns	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
All firms	163	13.1***	4.2***	0.7	1.5**	0.5	2.0	0.4	−0.4	0.0
Industrials	104	11.7***	4.9**	0.1	1.5*	0.2	0.6	0.1	−0.1	0.3
Food/beverage	12	14.0***	3.3*	1.4	6.4	1.3	0.9	0.5	0.5	−0.01
Textile/apparels	23	8.7***	0.9	−1.5	−1.0	0.1	1.8	−0.4	1.5	2.5**
Paper/publishing	14	16.6*	1.9	0.2	3.0**	1.7	−1.5	−2.5	−4.9***	0.1
Chemical/petroleum	12	13.9**	0.7	−0.7	1.0	−0.1	0.9	−0.4	−0.1	0.7
Mineral products	16	13.0***	20.1	−2.2	0.8	−1.2	0.0	1.7	−0.4	−0.4
Basic metal	6	13.1***	−1.6	0.7	1.6	−4.2**	−1.7	2.3	1.5	−2.0
Machinery equipment	21	7.7**	4.5***	3.3**	1.2	0.3	1.4	0.8	0.6	−0.6
Financials	46	15.0***	2.3	1.2	1.2	0.2	0.8	1.0	−1.3	−0.5
Banking	10	20.9	−1.1	−1.7	−0.6	−2.6*	−1.4**	2.6**	0.0	1.1
Insurance	7	10.0***	−2.3	−0.5	−0.9	0.5	1.4	−0.4	−1.9	−2.7***
Leasing/factoring	8	11.6*	0.3	2.3	1.2	−0.2	1.4	1.1	0.4	0.0
Holding/investment	21	15.2***	6.2**	2.6	2.9	1.7	1.4	0.6	−2.3*	−0.8
Others	14	17.6***	5.7**	3.4*	2.3	3.0	1.8	1.0	−0.1	−0.7
Trade	8	14.1*	2.9	0.8	0.5	3.4	−0.4	1.2	−0.5	0.4
Tourism/transportation	6	25.4***	9.1*	6.2	3.7	1.3	4.4	1.8	1.9	−3.8

*** Indicates statistical significance at the 1% level.
** Indicates statistical significance at the 5% level.
* Indicates statistical significance at the 10% level.

The immediate after-market AARs indicate that only food/beverage, machinery/equipment, holding/investment, and tourism/transportation groups continue to enjoy statistically significant positive excess returns. Other sub-sectors have either positive insignificant abnormal returns or negative significant abnormal returns.

The after-market cumulative abnormal returns (CARs) are reported on Table 4 for each sector and sub-sector, ranging from 2-day to 3-month period. For all of the firms the results indicate that the underpricing continues to be present in the first 4 weeks, but the magnitude of CARs seems to be increasing initially and declining afterwards. For example, for all of the firms at the end of the first week, CARs are 8.8%, and statistically significant at the 1% level. For the same period, Industrials sector experiences CARs of 7.3%, while others group has CARs of 30.3%, and Financial sector has CARs of 5.7%. While the results of the first two groups are statistically significant at 1%, that of the last group is only weakly significant at 5%. When one looks at the longer after-market time periods (up to 3 months), it is noticed that almost none of the CARs for the sectors and sub-sectors has statistically significant positive abnormal returns and the most of them experience insignificant negative abnormal returns. A notable point is that the sub-sectors, experiencing relatively higher initial market adjusted returns, seem to encounter relatively lower returns at the end of 3-month period. For example, Paper/Publishing group has an initial market adjusted return of 16.6%, while it has a 3-month market adjusted CARs of -15.1%. Similarly, Banking group has initial market adjusted return of 20.9% and a 3-month market adjusted return of -13%.

These results show that the Turkish IPOs, similar to other international IPOs, experience a statistically significant underpricing both on the initial day and in the immediate after-market periods. These results are in line with those of other international IPOs studies. But when the returns in a longer after-market time period are investigated, the reversal of the initial positive abnormal returns is observed.

5. Factors influencing the performances of IPOs

Table 5 reports the descriptive statistics and the correlation matrix of variables employed as potential explanatory variables for the cross-sectional differences in the initial underpricing.

There are a number of hypotheses regarding the possible explanation for IPOs. Generally, the literature on under-pricing relates the under-pricing phenomena to ex-ante uncertainty (Rock, 1986; Beatty and Ritter, 1986). In line with these studies, a positive relationship between the level of underpricing and the level of ex-ante uncertainty of a new issue is expected. Since it is not possible to measure ex-ante uncertainty directly, a number of variables are used as proxies. There are three variables used as proxies for ex-ante uncertainty in this study. These are the size of firms, the gross proceeds from going public, and the age of the firms.

Firm size (SIZE): the total assets of the firm prior going public are commonly used as size variable in IPOs studies. The size variable is employed to capture the

Table 4
After-market[a] cumulative abnormal returns (CARs) (%)

Sectors	Firms	CAR (2-day)	CARs (3-day)	CARs (4-day)	CARs (1-week)	CARs (2-week)	CARs (3-week)	CARs (4-week)	CARs (2-month)	CARs (3-month)
All Firms	163	4.9***	6.4***	6.8***	8.8***	8.6***	7.1***	4.7**	4.2	3.0
Industrials	104	5.0**	6.5***	6.7***	7.3***	7.2***	5.4**	4.8*	3.8	2.5
Food/beverage	12	4.6*	11.0**	12.3**	13.2**	11.1*	7.2	5.4	1.9	−1.9
Textile/apparels	23	−0.6	−1.7	−0.8	0.1	7.8**	10.0**	6.6	5.1	7.5
Paper/publishing	14	2.1	5.1*	6.8**	5.3*	−2.7	−7.9	−11.3*	−6.9	−15.1
Chemical/petroleum	12	−0.1	0.1	0.9	1.8	1.7	−2.8	−2.5	2.7	12.3
Mineral products	16	17.8	18.6*	17.4*	17.5*	15.0*	14.9*	19.8**	12.2	14.9
Basic metal	6	−0.8	0.7	−3.4	−5.1	−3.8	−5.5	−6.0	0.4	−1.5
Machinery equipment	21	7.8***	9.0***	9.3***	10.7***	10.6**	8.3*	8.2	5.8	−1.9
Financials	46	3.4*	4.7**	4.9**	5.7**	4.7	3.6	−2.5	−3.3	−3.6
Banking	10	−2.7	−3.3*	−6.0**	−7.3***	−1.8	−2.4	−11.6*	−12.5	−13.0
Insurance	7	−2.8	−3.6	−3.2	−1.8	−6.9	−4.5	−4.14	−7.5	−13.3
Leasing/factoring	8	2.5	3.7	3.5	5.0	4.1	1.3	−1.6	−12.9	−6.9
Holding/investment	21	8.8	11.7***	13.4***	14.8***	12.0**	10.0*	1.9	6.1*	5.4
Others	14	9.2***	11.4***	14.4***	30.2***	31.5***	31.1***	27.9***	32.2***	28.3**
Trade	8	3.6	4.1	7.5	7.1	7.2	3.5	1.8	5.1	9.8
Tourism/transport	6	15.3**	18.9**	20.2**	24.6	27.4	30.2	25.2	27.7	16.4

[a] Excluding initial trading day; 1 week corresponds to 5 trading days, while 1 month corresponds 20 trading days.
*** Indicates statistical significance at the 1% level.
** Indicates statistical significance at the 5% level.
* Indicates statistical significance at the 10% level.

Table 5
Descriptive statistics of variables

Variables	Mean	S.D.	Correlation matrix								
			1	2	3	4	5	6	7	8	9
1. ADJRET	0.131	0.261	1.000								
2. SIZE	11.120	1.981	−0.133	1.000							
3. AGE	19.534	14.328	−0.144	0.176	1.000						
4. PROCEEDS	8.684	1.368	−0.159	0.425	0.287	1.000					
5. MARKET	0.055	0.174	0.347	0.027	−0.064	0.036	1.000				
6. RATE	0.241	0.215	0.046	−0.302	−0.330	−0.103	0.082	1.000			
7. INSOWN	0.499	0.303	−0.212	0.434	0.174	0.274	−0.137	−0.181	1.000		
8. METHOD	0.306	0.462	−0.052	−0.087	−0.206	−0.085	0.086	0.164	−0.280	1.000	
9. SELF-IPO	0.184	0.388	0.231	0.091	0.018	0.026	−0.124	0.047	0.067	−0.178	1.00
10. PRIV	0.092	0.289	−0.095	0.105	0.230	0.206	−0.099	0.114	0.242	−0.211	−0.151

possibility that smaller firm IPOs are more speculative than those of larger firms. Hence, the larger firms' IPOs are expected to have lower uncertainty as compared to the smaller IPOs. This variable is measured as the natural logarithm of the total dollar value of assets at the end of year prior to the year of going public. A negative coefficient is expected for this variable.

Proceeds (PROCEEDS): the values of the gross proceeds are also employed to measure the ex-ante uncertainty related to a new issue. The smaller amount of proceeds may indicate a greater uncertainty about a firm's future compared to a larger amount of proceeds. The proceeds are converted into dollar amount by using the exchange rate on the last day of public offering sales to remove the effect of inflation. An inverse relationship between this variable and the initial underpricing is expected.

Operating history (AGE): the operating history of firm prior to going public is also employed as a proxy for ex-ante uncertainty. Since older firms have more information available to the public than younger firms do, the older firms are expected to have lower ex-ante uncertainty compared to the younger firms. Hence lower underpricing is expected for older firms. The age of the firm in years on flotation is used as variable and expected to be inversely related to the level of underpricing.

Market trend (MARKET): underpricing of IPOs may be a result of the rising stock market between the fixing of the offer price and first trading day. As a test for the institutional lag in the stock offering, this variable is constructed as the holding period market (the ISE-Composite Index) returns from the last day of the public offering to the first trading day. A positive relationship is expected.

Offer rate (RATE): the percentage of equity offered to public may signal the quality of IPOs to investors. According to Leland and Pyle (1977), the private information of pre-offering firm value is signaled to potential investors through the percentage of equity retained. They hypothesize that the value of the firm is positively related to the percentage of the equity retained in the firm by owners. Keasey and Short (1992) argue that a relatively high percentage of equity retention may reduce investors' uncertainty because the firms' owners have signaled their faith in business. On the other hand, a greater percentage of equity retained by owners may also be interpreted as less marketability of shares. In order to test the effect of the percentage of equity offered to public, the offer rate variable is employed. There is no pre-expectation regarding to the sign of this variable.

Privatization (PRIV): the privatization of government owned enterprises has been taking place in Turkey in last 10 years. Some of the enterprises are privatized by offering the existing shares of firms to public. To analyze the effects of privatization on IPOs performance, a dummy variable is employed. Since the proceeds of privatized firms will go to the government instead of firms, a higher level of underpricing may be expected. On the other hand, public enterprises are generally managed poorly and the main purpose of privatization is to increase the productivity of these firms. Hence, investors may expect better firm performance after the privatization process, which may imply less expected underpricing. The variable takes value of one if the IPO is taking place under the privatization program of government, and zero otherwise.

Institutional ownership (INSOWN): in order to test the effect of ownership structure on the initial performance of IPOs, the percentage institutional ownership of firms' stocks prior to going public is employed. Higher institutional ownership may align shareholders interest and hence, an inverse relationship is expected.

Method of going public (METHOD): IPOs can be classified as either the offering of new issues (i.e. primary) or the sales of previously issued outstanding shares (i.e. secondary). In latter case, proceeds will go to the existing shareholders and these funds may not be used for firms' growth strategies. This may suggest a higher level of underpricing. In former case, proceeds are used for the firm's goals. This institutional structure may provide an opportunity to test the impact of issuers' motives in going public. A dummy variable is employed and takes the value of one if offering is new issue, and zero otherwise.

Self-offered IPOs (SELF-IPO): Baron (1982)'s model proposes that investment bankers have more information about demand for securities than issuer, and that the quality of reputation of investment banker may indicate the quality of IPOs, and can, therefore, generate more demand for new stock. In his model, investment banker may profit from its information advantage by setting its issue price too low. Muscarella and Vetsuypens (1989) tests this model for US firms, in which issuer acts as underwriter for its own IPOs. In this case, no information asymmetry should be expected and underpricing should disappear. They find no significant differences in their two samples and provide evidence against information advantage of investment banks. To test this explanation for Turkish IPOs, a dummy variable is employed. This variable takes value of one if investment bankers underwrite their own IPOs or one of family-firms' IPOs, and zero otherwise.[8]

6. Cross-sectional regression results

The results of multivariate regression are reported on Table 6. Four variables may act as potential proxies for ex-ante uncertainty about market performances, namely firm size, proceeds, firm's age, and self-IPOs. A positive relationship between under-pricing and ex-ante uncertainty is expected. Additionally, the effects of possible market movement, the influence of percentage offered to public, the effect of ownership structure, the method of going to public, and privatization are employed as other variables to explain IPOs performance.

Univariate regressions were initially performed with under-pricing as the dependent variable, and statistically significant relationships were found for SIZE, PROCEEDS, MARKET, INSOWN, SELF-IPO, and AGE variables. Then multivariate regressions were performed and the results are reported on Table 6. The first regression indicates that while MARKET, and SELF-IPO variables have coeffi-

[8] Turkish private sector mainly consists of family-owned groups of companies, which commonly include a financial institution, and hence these groups may use a family owned financial institution as investment banker. When family owned financial institution is used as investment banker in the process of going public, these IPOs are considered under self-offering group.

cients of 0.566 and 0.198, respectively, and are statistically significant at 1% level, INSOWN variable with a coefficient of −0.127 is weakly significant at 10%. The market variable is intended to measure the effect of institutional lag on underpricing. The results indicate that MARKET variable has expected sign, which is statistically highly significant. The rising market between the offer price fixing time and the first trading day is one of the important determinants of under-pricing. The negative sign of INSOWN indicates that underpricing is lower in firms with higher institutional holdings. The size variable was one of the proxies for ex-ante uncertainty. The coefficient of this variable is −0.038, indicating an inverse relationship between firm size and under-pricing. The smaller firms would have greater underpricing, which is in line with expectations. The SELF-IPO variable is also highly significant and has a positive coefficient of 0.154, indicating that self-offered IPOs are underpriced more than others. This result contradicts with the hypothesis of Baron (1982) and is in line with studies finding no support for this hypothesis (i.e. Muscarella and Vetsuypens, 1989).

Table 6
Results of multiple regression analysis[a]

Variables	1	2	3	4
Constant	0.487 (3.37)***	0.342 (2.88)***	0.358 (2.99)***	0.314 (3.01)***
SIZE	−0.011 (−0.97)	−0.017 (−1.71)*	−0.024 (−2.44)**	−0.022 (−2.44)**
AGE	−0.002 (−0.14)	–	–	–
PROCEEDS	−0.018 (−0.16)	–	–	–
MARKET	0.566 (5.31)***	0.563 (5.26)***	0.593 (5.48)***	0.582 (5.53)***
RATE	−0.105 (−1.07)	−0.059 (−0.63)	−0.051 (−0.55)	–
INSOWN	−0.127 (−1.80)*	−0.135 (−1.90)*	–	–
METHOD	−0.051 (−1.18)	−0.046 (−1.07)	−0.029 (−0.68)	–
SELF−IPO	0.198 (3.99)***	0.192 (3.87)***	0.191 (3.82)***	0.198 (4.18)***
PRIV	0.031 (0.63)	0.007 (0.11)	0.032 (0.45)	–
R^2	0.27	0.25	0.23	0.23
Adj. R^2	0.23	0.22	0.21	0.21
F-value	6.31***	7.36***	7.85***	15.5***

[a] Underpricing $= \beta_0 + \beta_1(\text{size}) + \beta_2(\text{age}) + \beta_3(\text{proceeds}) + \beta_4(\text{market}) + \beta_5(\text{rate}) + \beta_6(\text{priv}) + \beta_7(\text{InsOwn}) + \beta_8(\text{method}) + \beta_9(\text{self-IPO}) + \varepsilon$; where: underpricing = market adjusted initial return; size = natural logarithm of the total assets of firm prior to offering; age = number of years in operation (operating history) before offering; proceeds = natural logarithm of US dollar value of proceeds from offering; market = market index returns from the last day of public offering to the first trading day; rate = percent of equity offered to public; priv = a dummy variable taking on the value of one if IPO is done under government privatization program and zero otherwise; InsOwn = percentage of ownership by institutions; method = a dummy variable taking on the value of one if firm issues primary shares and zero otherwise; Self-IPO = a dummy variable taking on the value of one if investment bankers underwrites their own IPOs or one of family-firms' IPOs and zero otherwise.

*** Indicates statistical significance at the 1% level.

** Indicates statistical significance at the 5% level.

* Indicates statistical significance at the 10% level.

RATE and AGE variables have the expected sign but they are not statistically significant. Two other insignificant variables are PRIV and METHOD. The first one has positive signs, indicating that privatized IPOs are more underpriced than others, and the second variable has negative sign, indicating new issued IPOs are less underpriced than previously issued stocks.

Regressions 2–4 report different combinations of variables employed. Three variables are consistently significant, namely SIZE, MARKET and SELF-IPO. These results indicate that initial underpricing in Turkish market is a result of rising stock market and investment bankers' underpricing issues possibly to leave a good taste with investor. This would, in turn, provide firms a chance to sell future offerings at a higher price than would, otherwise, be the case.

7. Summary and conclusion

The literature on the performance of IPOs suggests that investors purchasing IPOs at the offer price earn abnormal returns on initial trading day. This paper aims to provide an additional international evidence on the IPOs by examining the Istanbul Stock Exchange, which is considered as one of the fastest growing emerging markets. By using a sample of 163 firms listed and traded on the ISE, this study investigates both the initial and after-market performances of IPOs. The average market adjusted underpricing on the first trading day is found to be 13.6% for all sample, 12.2% for industrials, 15.3% for financials, and 18.5% for others. These results are highly significant and in the line with the results of other international studies on IPOs. When the factors influencing the initial performance of Turkish IPOs are investigated, size of issuer, rising stock market between the time of price fixing and first trading day, and self issued offerings appear to be the main determinants of the initial underpricing. Furthermore, the institutional ownership variable seems to be weakly influencing the initial underpricing. The results obtained from the self-offerings variable contradict with Baron (1982) hypothesis but is in line with Muscarella and Vetsuypens (1989). There is also a support for the ex-ante uncertainty measurements of Beatty and Ritter (1986) and Rock (1986).

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