Profitability and Volatility of IPO Firms and Underwriter Reputation

Jean Loo, Dong-Woo Lee and Jong-Hwan Yi

This paper examines whether underwriter reputation is related to the profitability and volatility of IPO firms before and after going public. It is found that firms taken public by more prestigious underwriters have higher post-IPO profitability and lower volatility when compared to those underwritten by investment banks without an established high reputation. During the pre-IPO period, this finding is weak and mixed. IPO firms with higher post-IPO profitability also tend to be older at the time of IPO. The finding is consistent with a scenario where underwriters with a higher reputation and more experience underwrite firms with higher anticipated post-IPO profitability.

I. INTRODUCTION

Since the seminal paper by Ritter (1991) that documented long-run stock underperformance of Initial Public Offerings (IPOs) during a three-year period after going public, there has been growing financial literature examining possible characteristics that explain cross-sectional variation in IPO returns. For example, Brav and Gompers (1997) found that venture capital-backed IPOs outperform nonventure capital-backed IPOs.[1] Yi (1997) found that IPO firms with positive earnings at the time of offering have higher returns during a three-year period after the IPO than firms that go public with losses.

Among various characteristics of IPOs that may be related to the aftermarket stock performance, underwriter reputation has been hypothesized to be an important factor. This is because the underwriters, with their costly reputation capital at stake, help resolve some of the information asymmetry problems between issuers and investors by certifying the offering and/or subsequent prices (see Beatty and Ritter (1986) and Booth and Smith (1986)). If reputation capital is a valuable asset, it is plausible that investment banks with a high reputation underwrite the best IPOs, while avoiding firms that perform poorly or are unduly risky in the post-IPO market. The issuers, on the other hand, try to engage high reputation underwriters to assist them in going

Jean Loo and **Jong-Hwan Yi**, Department of Finance and **Dong-Woo Lee**, Department of Accounting, California State University, Los Angeles, CA 90032.

public. However, because of the reputation capital of underwriters, only the most promising firms are likely to be taken public by those with a high reputation. This role of the underwriter reputation capital has motivated some researchers to relate the long-run stock performance of IPOs to the prestige of the underwriter. Carter, Dark and Singh (1998) documented that there are significant differences in the long-run stock returns of IPOs based on the reputation measure of the lead underwriter. That is, IPOs underwritten by higher reputation investment banks have higher long-run returns than those underwritten by less prestigious and less established investment banks.

Unlike the stock performance, the operating performance of IPO firms has received relatively little attention. Jain and Kini (1994) reported that IPO firms, on average, experience a significant decline in operating performance as they become public concerns. They found that profit margin, market-to-book ratio, price/earnings ratio, and earnings per share decrease steadily from the fiscal year prior to the IPO.

This paper investigates whether the underwriter reputation is a significant factor of the IPO firms' profitability in a cross-sectional study. To measure the profitability, we use two different but highly correlated measures of quarterly return on assets (ROA). They are income before extraordinary items divided by total assets (ROA1) and net income divided by total assets (ROA2).[2] If higher reputation underwriters are related to more promising IPOs, one would expect that IPO firms underwritten by more prestigious investment banks are associated with higher post-IPO profitability. Based on the results of previous studies on underwriter reputation and IPO stock returns, and high correlation between stock returns and operating performance of firms, we expect a significant and positive relation between underwriter reputation and the IPO firms' profitability.

In addition to the profitability of IPO firms, we also look at volatility measured by the variance of ROA during a three-year period after the IPO. To the extent that the variance of ROA represents a firm's profitability risk[3], we hypothesize that higher reputation underwriters are associated with firms with lower risk, holding other things equal. We also examine the pre-IPO period in order to study whether higher reputation underwriters are related to firms with higher pre-IPO profitability and lower volatility.

This paper finds that, during a three-year period after the IPO, firms taken public by more prestigious underwriters are associated with higher profitability and lower volatility than those underwritten by investment banks without an established high reputation. During the pre-IPO period, this finding is weak and mixed. Moreover, IPO firms with higher profitability tend to be older at the time of IPO. In general, the finding is consistent with a scenario where underwriters with higher reputation and more experience underwrite

firms with higher anticipated post-IPO profitability and lower volatility. The next section describes the sample and underwriter reputation measures used in this research. Data and methodology are discussed in section 3. Section 4 discusses empirical results. Section 5 concludes the paper.

II. SAMPLE DESCRIPTION

Our IPO data was collected from Investment Dealers Digest (IDD) and Moody's Manuals. The initial sample consisted of 1032 firm-commitment initial public offerings underwritten between 1987 and 1991. However, the sample period of this study started in 1984 and ended in1994 since three years of data before 1987 and after 1991 was used to derive profitability and volatility of the IPOs. We deleted firms that did not have available ROAs or had extreme values, i.e., 5,000% or greater in absolute value. Unit offerings, Real Estate Investment Trusts (REITs), American Depository Receipts, closed-end funds and issues with offering prices less than a dollar were excluded from the sample. We obtained a final sample of 540 IPO firms.

Table 1 describes the IPOs in terms of mean gross proceeds and median age of issuing firms. The number of IPOs in 1987 and 1991 is high, accounting for over 60% of IPOs in the sample. The mean gross proceeds, computed as the mean of offering price times the number of shares offered, range between $37.3 million and $58.0 million with an average close to $50 million. The age of a firm is defined as the year of IPO minus the year of foundation or original incorporation plus one. The median age of IPO firms is six years with a range between 5.5 years in 1989 and 8 years in 1988.

Table 1
Descriptive statistics of the sample

This table provides the number of initial public offerings, the average gross proceeds and the median age of the issuing firms in each year of the sample period. Age is the year of offering minus the year of foundation or original incorporation plus one. Gross proceeds are offering price times the number of shares offered.

Year	# of IPOs	Mean Gross Proceeds (in thousands)	Median Age of Issuer
1987	131	$37,264	6
1988	52	$46,188	8
1989	76	$52,285	5.5
1990	72	$46,943	6
1991	209	$57,972	6
Total	540	$49,543	6

Table 2 classifies the IPOs based on the reputation measure of lead underwriters. We rely on two reputation measures used in Carter, Dark and Singh (1998). The first reputation measure is an updated version of the reputation rank developed in Carter and Manaster (CM) (1990). The second measure is also an update of the reputation measure developed by Megginson and Weiss (MW) (1991).[4] Using two different reputation measures allows us to check the robustness of the results.

The CM measure, on a scale from 0 (lowest) to 9 (highest), is derived from a systematic analysis of the placement of underwriter names in the 'tombstones.' A tombstone announces a pending public security offering along with a list of investment banks in the underwriting syndicate that are ranked according to a hierarchical and alphabetical order. The reputation measure is determined by assigning a rank for each underwriter according to its position on the list.

The MW measure represents the relative market share of each underwriter. The relative market share is determined by the ratio of dollar amount of underwriting credited to each investment bank and the total underwriting amount for the industry. In an IPO, the lead underwriter gets full credit for the total dollar amount underwritten. The two underwriter reputation measures, CM and MW, are highly correlated as shown in Megginson and Weiss (1991) and in the empirical results section of this paper.

Table 2

Offering characteristics classified by reputation measures of lead underwriters

This table classifies the IPOs by the reputation measure of the lead underwriter. Panel A uses the reputation measure first developed by Carter and Manaster (1990). Panel B uses the reputation measure first developed by Megginson and Weiss (1991). The unmeasured category in each panel includes underwriters that lack the underwriter reputation measure. Age is the year of offering minus the year of foundation or original incorporation plus one. Gross proceeds are offering price times the number of shares offered.

Panel A: Carter and Manaster (CM)

Reputation Measure, CM	# of Underwriters	# of Issues	Median Age of Issuer	Mean Gross Proceeds (in 000)
$8.0 \leq CM$	26	369	6	$66,986
$6.0 \leq CM < 8.0$	27	75	6	$16,005
$4.0 \leq CM < 6.0$	31	53	7	$9,693
$0.0 \leq CM < 4.0$	8	16	5	$6,589
Unmeasured	24	27	4	$7,988
Total	**116**	**540**	**6**	**$49,543**

Panel B: Megginson and Weiss (MW)

Reputation Measure, MW	# of Underwriters	# of Issues	Median Age of Issuer	Mean Gross Proceeds (in 000)
$8.0 \leq MW$	6	160	5.5	$84,050
$2.0 \leq MW < 8.0$	8	115	6	$63,118
$0.25 \leq MW < 2.0$	19	108	5	$38,465
$0.0 \leq MW < 0.25$	59	130	6.5	$12,987
Unmeasured	24	27	4	$7,988
Total	**116**	**540**	**6**	**$49,543**

In panel A of Table 2, we group the underwriters into five categories based on the CM reputation measure. The last category, the 'unmeasured'

group, represents the underwriters that lack the CM reputation measure. These underwriters are either not found in any tombstone advertisement or not identified in the IPO sample in Carter, Dark and Singh (1998). Out of a total of 116 underwriters, 24 underwriters who take 27 firms public are in the 'unmeasured' category. Five groups of underwriters, based on the MW reputation measure, are presented in Panel B of Table 2. These groups are formed in such a way that each group has a roughly equal number of IPOs except for the 'unmeasured' group. The 27 IPOs in the CM 'unmeasured' group in panel A also appear in the MW 'unmeasured' group in Panel B.

In both Panels A and B, underwriters in the highest reputation category have the highest underwriting frequency. The 26 underwriters in the highest reputation group according to the CM measure average more than 14 offerings per underwriter while the rest average less than two offerings each. According to the MW reputation measure, the six underwriters in the highest group average more than 26 issues per underwriter while the rest average just over three issues each. Table 2 also reports the median age and mean gross proceeds of the IPOs. The proceeds raised by IPOs underwritten by more prestigious underwriters are larger. Note that the mean gross proceeds for IPOs underwritten by the most reputable group are $67 million and $84 million according to the CM and MW measures, respectively. On the other hand, the mean gross proceeds for the least reputable group are much lower. They are $6.6 million and $13 million according to the CM and MW measures, respectively. It appears, however, that there is no significant difference in the age of IPO firms across underwriter reputation categories. The median age of issuers ranges from four to seven years.

III. DATA AND METHODOLOGY

Two measures of return on assets, ROA1 and ROA2, are defined as follows:

$$ROA1 = \frac{\text{Income before extraordinary items}}{\text{Total assets}}$$

$$ROA2 = \frac{\text{Net income}}{\text{Total assets}},$$

where income before extraordinary items = Quarterly COMPUSTAT data item #8; net income = Quarterly COMPUSTAT data item #69; total assets = Quarterly COMPUSTAT data item #44.

The following regression models are developed for testing:

Model 1: MROA1 = $\beta 1$ + $\beta 2$ Underwriter Reputation Measure + $\beta 3$ Age + ε

Model 2: MROA2 = $\beta 1$ + $\beta 2$ Underwriter Reputation Measure + $\beta 3$ Age + ε

Model 3: VROA1 = $\beta 1$ + $\beta 2$ Underwriter Reputation Measure + $\beta 3$ Age + ε

Model 4: VROA2 = $\beta 1$ + $\beta 2$ Underwriter Reputation Measure + $\beta 3$ Age + ε

Two measures of underwriter reputation, the measure constructed by Carter and Manaster (1990) and the measure constructed by Megginson and Weiss (1991), are used for testing these regression models. MROA1 and MROA2 are the means of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. VROA1 and VROA2 are the variances of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. Age is the year of offering minus the year of founding or original incorporation plus one.

IV. EMPIRICAL RESULTS

We first investigate the relationship between underwriter reputation and operating profitability of IPO firms during a three-year period after the offerings. Two profitability measures are used. They are returns on assets (ROA) defined as income before extraordinary items divided by total assets (ROA1) and net income divided by total assets (ROA2), respectively. Variances of both ROAs are used to measure volatility. As discussed in the previous section, we rely on the work of Carter, Dark and Singh (1998) for two versions of underwriter reputation measure. Table 3 reports the mean and median ROAs and their variances of IPOs when the CM measure of underwriter reputation is used. Panel A is prepared for a three-year period after the IPO, with a total of 540 IPOs in the sample. We observe that as underwriter reputation measure rises, so do the mean and median ROAs. The mean (median) ROA1 rises from –0.06 (-0.03) for the least reputable group to 0.006 (0.013) for the most reputable group. Similar observation is found in ROA2. Conversely, the volatility of ROAs falls as the underwriter reputation measure rises. The mean (median) volatility measures fall from 0.049 (0.003) for the least reputable group to 0.002 (0.0002) for the most reputable group. In other words, IPOs underwritten by investment banks with a higher reputation

measure tend to have higher post-IPO mean and median ROAs and lower volatility.

It is also of interest to study whether high reputation underwriters market IPOs that are more profitable and less risky prior to the offering. The pre-IPO period consists of all quarters before the IPO with ROA data available via COMPUSTAT. Due to insufficient data, the sample size for this analysis is reduced to 291 IPOs. Panel B of Table 3 shows that underwriter reputation in relation to profitability and volatility is less evident in the pre-IPO period. The volatility of ROAs is greater for IPOs underwritten by investment banks without an established high reputation when median volatility of IPO firms is used. For example, the median volatility of ROAs goes up from 0.0001 for the most reputable group to 0.0030 for the least reputable group. However, the finding is mixed when mean volatility is used. On the other hand, the mean ROAs are higher for IPOs underwritten by more prestigious investment bankers. The mean ROAs range from –0.13 for the least reputable group to –0.008 for the most reputable group. The results are mixed when median ROAs are used. It is also noted that the mean ROAs are negative for all IPO groups, while the median ROAs are positive. This is due to a few companies that reported very large negative ROAs before the IPO. Very large negative ROAs resulted in negative means and positive medians.

In order to see whether our findings are sensitive to the choice of underwriter reputation measure, we reiterated Table 3 using the MW reputation measure. The results are reported in Table 4. We again found that IPOs underwritten by more reputable investment banks tend to have higher ROAs and lower volatility during a three-year period after the IPO as shown in panel A. The mean ROAs rise from –0.023 to 0.013 and the mean volatility falls from 0.012 to 0.002 for the least reputable group and the most reputable group, respectively. However, the underwriter reputation in relation to ROAs and volatility is mixed before the offering as shown in panel B of Table 4.

Table 3

Mean and variance of return on assets (ROA) by CM measure of underwriter reputation group

This table reports the means (medians) of individual firm's MROA1, VROA1, MROA2 and VROA2 by underwriter reputation group. ROA1 is defined as income before extraordinary items/total assets and ROA2 as net income/total assets. MROA1 and MROA2 are the means of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. VROA1 and VROA2 are the variances of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. Unmeasured group includes the underwriters that lack the reputation measure. CM is the updated measure of underwriter reputation first constructed by Carter and Manaster (1990).

Panel A: Post-IPO (N=540)

Underwriter Reputation	MROA1	VROA1	MROA2	VROA2
$8.0 \leq$ CM	0.0063 (0.0137)	0.0016 (0.0002)	0.0061 (0.0129)	0.0017 (0.0002)
$6.0 \leq$ CM < 8.0	-0.0001 (0.0098)	0.0024 (0.0002)	-0.0002 (0.0096)	0.0024 (0.0003)
$4.0 \leq$ CM < 6.0	-0.0344 (0.0041)	0.0108 (0.0006)	-0.0342 (0.0041)	0.0109 (0.0006)
$0.0 <$ CM < 4.0	-0.0596 (-0.0363)	0.0494 (0.0030)	-0.0584 (-0.0344)	0.0421 (0.0034)
Unmeasured	-0.0459 (0.0110)	0.0063 (0.0009)	-0.0449 (0.0105)	0.0066 (0.0009)

Panel B: Pre-IPO (N=291)

Underwriter Reputation	MROA1	VROA1	MROA2	VROA2
$8.0 \leq$ CM	-0.0086 (0.0159)	0.0071 (0.0001)	-0.0076 (0.0164)	0.0073 (0.0001)
$6.0 \leq$ CM < 8.0	-0.0237 (0.0224)	0.0431 (0.0002)	-0.0238 (0.0228)	0.0432 (0.0002)
$4.0 \leq$ CM < 6.0	-0.0628 (0.0238)	0.0250 (0.0009)	-0.0620 (0.0238)	0.0254 (0.0009)
$0.0 <$ CM < 4.0	-0.1275 (0.0086)	0.0103 (0.0025)	-0.1277 (0.0076)	0.0104 (0.0026)
Unmeasured	-0.2037 (0.0279)	0.5606 (0.0017)	-0.1999 (0.0279)	0.5610 (0.0028)

Table 4

Mean and variance of return on assets (ROA) by MW measure of underwriter
reputation group

This table reports the means (medians) of individual firm's MROA1, VROA1, MROA2
and VROA2 by underwriter reputation group. ROA1 is defined as income before
extraordinary items/total assets and ROA2 as net income/total assets. MROA1 and
MROA2 are the means of quarterly ROA1 and ROA2 over the 3-year period after and
the period before the IPO for each firm. VROA1 and VROA2 are the variances of
quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO
for each firm. MW is the updated measure of underwriter reputation first constructed
by Megginson and Weiss (1991). Unmeasured group includes the underwriters that
lack the reputation measure.

Panel A: Post-IPO (N=540)

Underwriter Reputation	MROA1	VROA1	MROA2	VROA2
$8.0 \leq$ MW	0.0125	0.0016	0.0128	0.0014
	(0.0164)	(0.0001)	(0.0157)	(0.0002)
$2.0 \leq$ MW < 8.0	0.0039	0.0010	0.0031	0.0015
	(0.0114)	(0.0002)	(0.0110)	(0.0002)
$0.25 \leq$ MW < 2.0	0.0010	0.0016	0.0006	0.0017
	(0.0090)	(0.0003)	(0.0087)	(0.0003)
$0.0 <$ MW < 0.25	-0.0232	0.0122	-0.0230	0.0113
	(0.0092)	(0.0004)	(0.0086)	(0.0004)
Unmeasured	-0.0459	0.0063	-0.0449	0.0066
	(0.0110)	(0.0009)	(0.0105)	(0.0009)

Panel B: Pre-IPO (N=291)

Underwriter Reputation	MROA1	VROA1	MROA2	VROA2
$8.0 \leq$ MW	-0.0072	0.0054	-0.0061	0.0058
	(0.0168)	(0.0001)	(0.0173)	(0.0001)
$2.0 \leq$ MW < 8.0	0.0084	0.0014	0.0089	0.0016
	(0.0142)	(0.0001)	(0.0140)	(0.0001)
$0.25 \leq$ MW < 2.0	-0.0091	0.0046	-0.0085	0.0048
	(0.0166)	(0.0001)	(0.0204)	(0.0001)
$0.0 <$ MW < 0.25	-0.0656	0.0440	-0.0649	0.0441
	(0.0194)	(0.0004)	(0.0228)	(0.0005)
Unmeasured	-0.2037	0.5606	-0.1999	0.5610
	(0.0279)	(0.0017)	(0.0279)	(0.0028)

In Table 5, the profitability, volatility, and the underwriter reputation
measures (both CM and MW) are correlated. Pearson and Spearman correlation

coefficients are reported above the diagonal and below the diagonal, respectively. Panel A of Table 5 reports the results for post-IPO period. The CM and MW reputation measures are highly and significantly correlated at the 1% level. They have a Pearson correlation coefficient of 0.5045. Both ROAs (ROA1 and ROA2) have positive correlation coefficients with the CM and MW reputation measures. The correlation coefficients are 0.2659 and 0.2623 with the CM measure, and 0.1771 and 0.1809 with the MW measure. All are significant at the 1% level. Volatility measures are significantly and negatively correlated with the CM measure with correlation coefficients of –0.1388 and –0.1467. They are negatively but less significantly related with the MW measure. Similar results are obtained when Spearman correlation coefficients are used. In other words, the underwriter reputation measure is significantly and positively related to ROAs while significantly and negatively related to volatility. The evidence is stronger when the CM measure is used than when the MW measure is used.

Panel B of Table 5 provides the correlation coefficients for the pre-IPO period. According to Pearson correlation coefficient, the CM and MW measures are significantly and positively correlated with a correlation coefficient of 0.4707. Both ROAs are positively and significantly correlated with the CM measure. The correlation is positive but less significant with the MW measure. Negative correlation coefficients between volatility and the CM measure are observed. These negative correlation coefficients become insignificant when the MW measure is used. According to Spearman correlation coefficients, ROAs have insignificant correlation with both the CM and MW measures and volatility measures have significant and negative correlation with the CM and MW measures. In summary, during the pre-IPO period, the relationship between the underwriter reputation measures, profitability and volatility appears to be weak and mixed.

Table 5
Correlation coefficients between underwriter reputation and mean and variance of ROA

Spearman correlation coefficients are reported below the diagonal (shaded area) and Pearson correlation coefficients are reported above the diagonal. P-values are reported in parentheses. ROA1 is defined as income before extraordinary items/total assets and ROA2 as net income/total assets. MROA1 and MROA2 are the means of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. VROA1 and VROA2 are the variances of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. CM and MW are the updated measures of underwriter reputation first constructed by Carter and Manaster (1990) and Megginson and Weiss (1991), respectively.

Panel A: Post-IPO (N=540)

	CM	MW	MROA1	VROA1	MROA2	VROA2
CM	1.0000	0.5045	0.2659	-0.1388	0.2623	-0.1467
	(0.0000)	(0.0001)	(0.0001)	(0.0012)	(0.0001)	(0.0006)
MW	0.8090	1.0000	0.1771	-0.0766	0.1809	-0.0858
	(0.0001)	(0.0000)	(0.0001)	(0.0754)	(0.0001)	(0.0462)
MROA1	0.2432	0.1859	1.0000	-0.5256	0.9978	-0.5710
	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
VROA1	-0.2466	-0.2245	-0.4399	1.0000	-0.5113	0.9928
	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0001)	(0.0001)
MROA2	0.2429	0.1806	0.9908	-0.4344	1.0000	-0.5602
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0001)
VROA2	-0.2419	-0.2132	-0.4360	0.9727	-0.4451	1.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)

Panel B: Pre-IPO (N= 291)

	CM	MW	MROA1	VROA1	MROA2	VROA2
CM	1.0000	0.4707	0.2159	-0.2061	0.2135	-0.2061
	(0.0001)	(0.0001)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
MW	0.7698	1.0000	0.1092	-0.0720	0.1085	-0.0718
	(0.0001)	(0.0001)	(0.0627)	(0.2209)	(0.0647)	(0.2219)
MROA1	-0.0462	-0.0874	1.0000	-0.6229	0.9993	-0.6228
	(0.4322)	(0.1368)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
VROA1	-0.1713	-0.1721	-0.1509	1.0000	-0.6216	1.0000
	(0.0034)	(0.0032)	(0.0099)	(0.0001)	(0.0001)	(0.0001)
MROA2	-0.0366	-0.0855	0.9778	-0.1571	1.0000	-0.6214
	(0.5342)	(0.1455)	(0.0001)	(0.0073)	(0.0001)	(0.0001)
VROA2	-0.1684	-0.1595	-0.1642	0.9509	-0.1780	1.0000
	(0.0040)	(0.0064)	(0.0050)	(0.0001)	(0.0023)	(0.0001)

Table 6
The results of regression analysis
CM measure of underwriter reputation

This table reports the regression results of following models:

$$\text{Model 1: MROA1} = \beta_1 + \beta_2 \text{ CM} + \beta_3 \text{ Age} + \varepsilon$$
$$\text{Model 2: MROA2} = \beta_1 + \beta_2 \text{ CM} + \beta_3 \text{ Age} + \varepsilon$$
$$\text{Model 3: VROA1} = \beta_1 + \beta_2 \text{ CM} + \beta_3 \text{ Age} + \varepsilon$$
$$\text{Model 4: VROA2} = \beta_1 + \beta_2 \text{ CM} + \beta_3 \text{ Age} + \varepsilon$$

ROA1 is defined as income before extraordinary items/total assets and ROA2 as net income/total assets. MROA1 and MROA2 are the means of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. VROA1 and VROA2 are the variances of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. CM is the updated measure of underwriter reputation first constructed by Carter and Manaster (1990). Age is the year of offering minus the year of founding or original incorporation plus one. T-statistics are reported in parentheses.
*** denotes significance at the 0.01 level (two-sided test), ** at the 0.05 level, and * at the 0.10 level.

Panel A: Post-IPO (N=540)

	Model 1	Model 2	Model 3	Model 4
β_1	-0.0634***	-0.0623***	0.0198***	0.0183***
	(-6.684)	(-6.590)	(4.068)	(4.358)
β_2	0.0074***	0.0073***	-0.0019***	-0.0018***
	(6.270)	(6.180)	(-3.189)	(-3.374)
β_3	0.0004*	0.0004*	-0.0001	-0.0001
	(1.949)	(1.872)	(-0.802)	(-0.844)
Adjusted R^2	0.0738***	0.0714***	0.0168***	0.0192***
	(F=22.473)	(F=21.719)	(F=5.604)	(F=6.268)

Panel B: Pre-IPO (N=291)

	Model 1	Model 2	Model 3	Model 4
β_1	-0.1834***	-0.1811***	0.3687***	0.3690***
	(-4.421)	(-4.349)	(3.849)	(3.853)
β_2	0.0189***	0.0188***	-0.0424***	-0.0424***
	(3.666)	(3.624)	(-3.555)	(-3.556)
β_3	0.0009	0.0009	-0.0003	-0.0003
	(1.261)	(1.220)	(-0.146)	(-0.147)
Adjusted R^2	0.0453***	0.0439***	0.0359***	0.0359***
	(F=7.876)	(F=7.659)	(F=6.397)	(F=6.400)

Table 6 presents regression results when each of the profitability and volatility measures is used as a dependent variable. The CM measure of underwriter reputation and the age of the issuer are the explanatory variables. Panel A reports the results for post-IPO period. In explaining ROAs, the underwriter reputation measure is significant at the 1% level and has positive regression coefficients of 0.0074 and 0.0073. On the other hand, in explaining volatility, the underwriter reputation measure is significant at the l% level with negative regression coefficients of -0.0019 and –0.0018. Age of the issuer is significantly positive but only at the 10% level in explaining profitability and insignificant in explaining volatility. The overall results suggest that the more reputable the underwriters are, the more profitable and less risky the IPO firms appear to be during a three-year period after the offering.

Panel B of Table 6 shows the regression results for the pre-IPO period. The regression coefficients for underwriter reputation are positive and significant at the 1% level in explaining profitability. They are negative and significant in explaining volatility. The regression coefficients for the age variable are insignificant. In other words, we found that IPO firms underwritten by more prestigious investment banks according to the CM measure tend to have higher profitability and lower volatility before the IPO. The age of the issuer, however, does not play any role in explaining the profitability and volatility of the IPO firms prior to the offering.

The regression results when the MW measure of underwriter reputation is used are reported in Table 7. For the post-IPO period, the regression coefficients for underwriter reputation are positive (0.0027 and 0.0028) and significant at the 1% level in explaining profitability. They are negative (-0.0006 and –0.0006) and significant at the 10% level in explaining volatility. The age of the issuer has a positive and significant effect on the profitability of the IPO firms but has an insignificant effect on the volatility.

Table 7
The results of regression analysis
MW measure of underwriter reputation

This table reports the regression results of following models:

$$\text{Model 1: MROA1} = \beta_1 + \beta_2 \text{ MW } + \beta_3 \text{ Age} + \varepsilon$$
$$\text{Model 2: MROA2} = \beta_1 + \beta_2 \text{ MW } + \beta_3 \text{ Age} + \varepsilon$$
$$\text{Model 3: VROA1} = \beta_1 + \beta_2 \text{ MW } + \beta_3 \text{ Age} + \varepsilon$$
$$\text{Model 4: VROA2} = \beta_1 + \beta_2 \text{ MW } + \beta_3 \text{ Age} + \varepsilon$$

ROA1 is defined as income before extraordinary items/total assets and ROA2 as net income/total assets. MROA1 and MROA2 are the means of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. VROA1 and VROA2 are the variances of quarterly ROA1 and ROA2 over the 3-year period after and the period before the IPO for each firm. MW is the updated measure of underwriter reputation first constructed by Megginson and Weiss (1991). Age is the year of offering minus the year of foundation or original incorporation plus one. T-statistics are reported in parentheses.
*** denotes significance at the 0.01 level (two-sided test), ** at the 0.05 level, and * at the 0.10 level.

Panel A: Post-IPO (N=540)

	Model 1	Model 2	Model 3	Model 4
β_1	-0.0181***	-0.0182***	0.0075***	0.0072***
	(-4.240)	(-4.278)	(3.473)	(3.862)
β_2	0.0027***	0.0028***	-0.0006*	-0.0006*
	(4.063)	(4.158)	(-1.727)	(-1.941)
β_3	0.0004**	0.0004**	-0.0001	-0.0001
	(2.096)	(2.013)	(-0.913)	(-0.954)
Adjusted R^2	0.0356***	0.0364***	0.0037	0.0054*
	(F=10.963)	(F=11.174)	(F=2.003)	(F=2.452)

Panel B: Before the IPO (N=291)

	Model 1	Model 2	Model 3	Model 4
β_1	-0.0590***	-0.0577***	0.0770*	0.0771*
	(-3.363)	(-3.279)	(1.897)	(1.901)
β_2	0.0053*	0.0053*	-0.0082	-0.0082
	(1.822)	(1.809)	(-1.212)	(-1.210)
β_3	0.0011	0.0010	-0.0006	-0.0006
	(1.433)	(1.390)	(-0.347)	(-0.348)
Adjusted R^2	0.0121*	0.0115*	-0.0013	-0.0013
	(F=2.778)	(F=2.692)	(F=0.810)	(F=0.807)

Panel B of Table 7 reports regression results for the pre-IPO period. Underwriter reputation according to the MW measure has a positive but weak relationship with the profitability of IPO firms and no relationship with the volatility of IPO firms prior to the offering. The age of the issuers has no significant relationship with either profitability or volatility of IPO firms prior to the offering.

V. CONCLUSIONS

This study examines the long-run profitability measured by return on assets (ROA) and volatility measured by variance of ROA of IPOs in relation to the underwriter reputation. We found that IPOs that are underwritten by more reputable investment banks appear to have higher profitability and lower volatility during a three-year period after the offering. We also found that older issuing firms tend to have higher profitability after the offering. However, for the pre-IPO period, the role of underwriter reputation is weak in explaining profitability and insignificant in explaining volatility. The age of the issuer does not seem to be important in explaining profitability or volatility of IPO firms prior to the offering. The results are consistent when two versions of underwriter reputation measure, i.e. CM and MW, are used. Our evidence suggests that underwriters with high reputation underwrite firms that are anticipated to be more profitable and less risky after the offering.

NOTES

1. They found that the difference in stock performance is significant when returns are computed on an equally-weighted basis. They also found that the difference is largely due to the severe underperformance of small firms.
2. There are two main reasons why we chose ROA over other measures of profitability, such as return on equity (ROE). First, ROA is a more commonly used measure of profitability. Second, total assets are more stable and thus, a better denominator in deriving return. ROE may not be stable as equity can be very small and sometimes even negative.
3. Amit and Livnat (1988) used standard deviation of a profitability ratio as a measure of risk.
4. See Carter, Dark and Singh (1998) for details of the update.

REFERENCES

[1]   Amit, R., and Livnat, J. (1988) "Diversification, Capital Structure, and Systematic Risk: an Empirical Investigation." *Journal of Accounting, Auditing & Finance*. 3, (Winter). 19-43.

[2]   Beatty, R., and Ritter J. (1986) "Investment Banking, Reputation, and the Underpricing of Initial Public Offerings." *Journal of Financial Economics*. 15, (Jan/Feb). 213-232.

[3]   Booth, J., and Smith R. (1986) "Capital Raising, Underwriting and the Certification Hypothesis." *Journal of Financial Economics*. 15, (Jan/Feb). 261-281.

[4]   Brav, A., and Gompers, P. (1997) "Myth or Reality? The Long-Run Underperformance of Initial Public Offerings: Evidence from Venture and Nonventure Capital-backed Companies." *Journal of Finance*. 52, (December). 1791-1821.

[5]   Carter, R., Dark, F., and Singh, A. (1998) "Underwriter Reputation, Initial Returns, and the Long-Run Performance of IPO Stocks." *Journal of Finance*. 53, (February). 285-311.

[6]   Carter, R., and Manaster, S. (1990) "Initial Public Offerings and Underwriter Reputation." *Journal of Finance*. 45, (September). 1045-1067.

[7]   Jain, B., and Kini, O. (1994) "The Post-Issue Operating Performance of IPO Firms." *Journal of Finance*. 49, (December). 1699-1726.

[8]   Megginson, W., and Weiss, K. (1991) "Venture Capitalist Certification and Initial Public Offerings." *Journal of Finance*. 46, (July). 879-904.

[9]   Ritter, J. (1991) "The Long-Run Performance of Initial Public Offerings." *Journal of Finance*. 46, (March). 3-27.

[10]   Yi, J. (1997) "Pre-Offering Earnings and the Long-Run Performance of IPOs." Doctoral Dissertation, University of Southern California.