AFTERMARKET RISK AND UNDERPRICING OF INITIAL PUBLIC OFFERS IN THE ARABIAN GULF COUNTRIES: AN EMPIRICAL ANALYSIS

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ABSTRACT

The recent evidence has shown that IPO uncertainty continues in aftermarket until a normal market is established. Evidence also indicates that aftermarket risk measured by stock's beta is related to the degree of underpricing in the US market. This may imply that additional underpricing may be required to compensate for aftermarket risk, assuming that the aftermarket risk is important for the investors who want to buy primary shares from the public offers and/or aftermarket trading. Therefore, we examine the relationship between aftermarket risk and underpricing by using data from six Arabian Gulf countries, an economic region where all personal incomes including capital gains are tax-free. The evidence based on 147 samples depicts that IPO firm's aftermarket risk measured by stock's beta has significant relationship with the degree of underpricing. Thereby, it is confirmed that the relationship between aftermarket risk and underpricing also exists in the Arabian Gulf countries, an important economic region outside the US. Paper concludes that that underwriters and/or issuers may need to forecast the expected aftermarket risk while determining the offer price.

JEL: G30 and G32

KEY WORDS: IPO Underpricing, Aftermarket Risk, and Arabian Gulf Markets

INTRODUCTION

The underpricing of initial public offers (IPO) is a global phenomenon that has been investigated by numerous researchers from different dimensions of underpricing (see Loughran *et al.,* 1994 for global evidence on IPO underpricing and Jenkinson and Ljungqvist (2001) for a critical review of the vast IPO literature). Researchers offer several theories suggesting that underpricing is inevitable due to information asymmetry among the parties involved in IPO process. These include winner's curse theory (Rock, 1986); signaling theory (Allen and Faulhaber, 1989; and Grinblatt and Hwang, 1989); and price delegation theory (Baron, 1982). In addition, researchers have offered explanation of underpricing in the light of institutional factors, such as underwriter price supports and pre-issue information gathering (Ruud, 1993; and Benveniste and Spindt, 1989), need for ownership dispersion and secondary market liquidity (Brennan and Frank, 1997; Bodnaruk *et. al*., 2008; and Booth and Chua, 1996), and listing delay after offer pricing, (Chowdhry and Sherman, 1996). Explanations of underpricing also appear with respect to fads and divergence of opinion in primary market (Aggarwal and Rivoli, 1990; Miller, 1977; and Gao *et. al*., 2006). Of these theories, many of them have basically considered an ideal market condition while explaining IPO underpricing as an equilibrium phenomenon due to ex-ante uncertainty in primary market.

Plenty of empirical studies have examined IPO underpricing across the world, and found evidence of ex-ante uncertainty in the primary markets using numerous proxy variables, but recent evidence has found that market uncertainty continues in the aftermarket period until normal market is established (Chen and Wilhelm, 2008 and Falconieri, *et. al*., 2009). Evidence is also found that IPO aftermarket beta and initial underpricing are correlated in the US (Gleason, *et. al.,* 2008). These findings may imply that underpricing is needed to compensate IPO aftermarket risks in addition to ex-ante uncertainty if investors want to buy shares from the public offers and/or aftermarket trading. Therefore, the evidence of correlation between

aftermarket stock's beta and underpricing needs confirmation from different markets outside the US. Hence, we examine the relationship between aftermarket risk and the level of underpricing using data from the markets of Arabian Gulf countries (e.g. Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Bahrain, and Oman), an important economic region where all personal incomes and capital gains are tax-free. It is noted that none of the Arabian Gulf Countries imposes taxes on the personal incomes (including capital gains) of their local and expatriates residents.

However, the foreign companies doing business in the region usually need to pay corporate taxes at different rates depending on the nature of their business. The local companies are however exempted from the corporate taxes. In Saudi Arabia, both the individuals and corporations (except foreigners) need to pay 2.5 percent of the surplus liquid assets (not annual income) as 'Zakat', a religious obligatory donation from the rich Muslim citizens to poor citizens of the country. Hence this is not a tax on the current income. It is pertinent to note that none of the gulf countries impose taxes on the capital gains from portfolio investments. This is an important issue because capital gain is a taxable income in many countries. Hence, IPO underpricing may be needed to cover any potential tax effect in the countries where initial return is taxable (Rydqvst, 1997; Guenther; Willenborg, 1999; and Riano et al, 2007). Thus Arabian Gulf markets are different from the other markets.

The findings on these markets will give us a better understanding about the relationship between aftermarket risk and underpricing of initial public offers, particularly whether such relationship prevails in the different markets. We hypothesized that positive relationship between the aftermarket risks and underpricing may exist in the Arabian Gulf markets, because uncertainty about IPO value may not be fully resolved until a normal market is established after listing. Hamada's (1972) theory also justifies a positive relationship between the aftermarket risk and underpricing, because the aftermarket beta may have a link to the firm's business and financial risks that have been inherited from the period before listing.The study based on 147 IPOs showed that average IPO underpricing in the Arabian Gulf markets is about 250 percent, suggesting high risk in the primary markets of this region. The finding is consistent with the previous finding based on 47 Arabian Gulf IPOs that is reported by Al-Hassan, *et al*. (2010). It is found underpricing is significantly correlated with the aftermarket risk factor (stock's beta), supporting the prior findings in the US market that is reported by Gleason, *et. al.* (2008). While the direction of relationship (causality) between the aftermarket risks and underpricing is yet to be thoroughly investigated, the regression models that include beta as an explanatory variable with underpricing as dependant variable have more explanatory power than that of the models which include beta as dependant variable with underpricing as an explanatory variable. Given the above results, it is suggested that underwriters and/or issuers may need to forecast the expected aftermarket risk while determining the offer price, and thereby, underpricing may reflect the level of aftermarket risk.

The rest of the paper is organized as follows: in the next section, the relevant literature and main hypothesis is discussed. In the subsequent sections, we describe respectively the research methodology, sample characteristics and empirical findings. Finally, the conclusion is given in the last section

LITERATURE REVIEW AND HYPOTHESIS

A common premise of major IPO theories noted earlier is that the underwriters and issuers have difficulties in assessing fair value of shares to be offered, which is known as IPO ex ante uncertainty. A review on IPO studies presented by Jenkinson and Ljungqvist (2001) overwhelmingly shows that higher IPO ex-ante uncertainty results in higher initial returns across the countries. These studies used different proxy variables (e.g. underwriter reputation, offer size, ownership retention by directors, industry classification etc.) to examine the effect of ex-ante uncertainty on IPO underpricing. The issuers and underwriters face uncertainty of new issue valuation before its listing on the stock exchange, but efforts are usually made to set a best possible offer price by book building process. There are questions here as to

whether it is possible to correctly estimate the degree of ex-ante uncertainty, or uncertainty remains after IPO listing and if the price discount offered through underpricing of IPOs can justify the level of uncertainty at the time of and after the IPO. In this regard, literature shows that the degree of uncertainty and information asymmetry among investors is not completely resolved prior to secondary market trading, despite underwriter's book building efforts. Indeed, uncertainty is found to be significantly prevalent in early aftermarket period until a normal market condition appeared (Chen and Wilhelm, 2008 and Falconieri, *et. al*., 2009).

In the mainstream literature, the effect of IPO ex-ante uncertainty on underpricing is well known from the findings of numerous studies that used different ex-ante uncertainty proxy variables. Earlier studies however recognized that uncertainty in the primary market should be measured based on the risks which are priced in the market, but they did not consider the stock's beta as a suitable proxy for it by arguing that the ex-ante risk is different from the stock's beta (Johnson and Miller, 1988; Beatty and Ritter, 1986; and Ritter, 1984). While a direct measure of risk for ex-ante uncertainty is difficult to find, some researchers used aftermarket standard deviation as ex-post measure of IPO ex-ante uncertainty (e.g., Ritter 1984, Beatty and Ritter, 1986). They found a strong relationship between the aftermarket return standard deviation and IPO initial return. The relationship between the aftermarket volatility and IPO initial returns also appeared in recent literature (Jog and Wang, 2009 and Pettway *et. al.* 2008). These findings seemed to be consistent with the above discussion that the degree of uncertainty is not completely resolved prior to secondary market trading, but rather it prevails in the aftermarket period.

According to asset pricing theory 'standard deviation' measures the total risk of investment that consists of 'unsystematic' and 'systematic' components. Beneda and Zhang (2009) found a negative relationship between the initial unsystematic volatility level and post-IPO volatility change. Their results showed a significant positive association of underpricing with the initial systematic variance, but insignificant association is observed between the initial returns and unsystematic variance in the aftermarket period. The finding suggests that the aftermarket standard deviation would not be very relevant in determining IPO underpricing though it measures the total risk of newly listed stocks. If uncertainty is the reason for underpricing, then underwriter/issuers should consider the risk element that is priced in the market. Since trading price data is not available in primary markets, it is not possible to estimate market beta that is priced in the market. An earlier study by Almisher and Kish (2000) used 'accounting beta' as a proxy for IPO ex-ante uncertainty by arguing that there is an association between the market and accounting betas.

They found that accounting beta of IPO companies have significant positive effect on the level of underpricing giving initial support to the idea that IPO uncertainty proxy should accommodate the risk that is priced in the market. However, Beatty and Ritter (1986) argued that the ex-ante uncertainty which causes IPO underpricing does not conform to the notion of systematic risk (beta) due to limitation in diversifying the IPO investments by uninformed investors. Therefore, earlier studies did not consider the 'beta' as a useful proxy for measuring IPO risk on this theoretical ground. As a result of this and because of the difficulty in measuring the beta coefficient for IPO companies prior to their listing, researchers paid less attention on this issue. Recently, Gleason, *et. al,* (2008) documented using US data that aftermarket risk following IPO is higher for the firms that experienced a higher level of underpricing. This finding motivates us to revisit the beta issue and examine it in a different location. Gleason, *et. al.,* 2008 analyzed that underpricing not only reflects the uncertainty at the time of the offering, but also is useful indicator of aftermarket risk. We can also analyze the evidence of positive relationship between the underpricing and aftermarket risk in the light of Hamada's (1972) theory, which suggests that a security's market beta is due to the business and financial risks of the corporate firm. If an IPO firm inherits such business and financial risks from the prelisting period, then beta may display relationship with the initial underpricing.

Based on the above analyses, we draw test hypothesis as follows:

H_0: There is no positive relationship between IPO firm's Aftermarket risk and initial return.

H_A: There is positive relationship between IPO firm's Aftermarket risk and initial return.

If IPO firm's aftermarket beta has positive relationship with the level of underpricing then it can be suggested that that the level of underpricing needs to justify for market's uncertainty both at the time of and after IPO listing until the normal market is established over the long run. This is particularly important for the investors who want to retain IPO stocks in the aftermarket period. The above hypotheses have been examined using data from the markets of Arabian Gulf region. This helps us confirming whether the relationship between the IPO aftermarket risk and underpricing also exists in different economies outside US where personal incomes and capital gains are not taxable.

METHODOLOGY

The study applied regression method to examine the IPO underpricing levels in Arabian Gulf markets. The dependent variable, level of underpricing, is estimated on the day of listing using follows measures.

$$MAIR_1 = \frac{1}{N}\sum_{i=1}^{N} IR_i - R_m \quad (1)$$

Where, $MAIR_1$ is the market-adjusted average initial return on the 1st day of IPO listing. IR_i is the initial return for IPO *i* calculated as $(P_{it} - P_{io})/P_{io}$ from the day of public offer to the close of the first trading day following listing. P_{it} is the closing market price of IPO *i* on the 1st trading day and R_m is the market return calculated for the same period, using the respective market's value-weighted price index. In a similar manner, underpricing is also estimated on the 30th day after listing in order to examine the consistency of results. This is denoted as $MAIR_{30}$ and estimated as under:

$$MAIR_{30} = \frac{1}{N}\sum_{i=1}^{N} IR_i - R_m \quad (2)$$

Where, $MAIR_{30}$ is the market-adjusted average initial return on the 30th day of IPO listing. IR_i is the initial return for IPO *i* calculated as $(P_{it} - P_{io})/P_{io}$ from the day of public offer to the close of the 30th trading day following listing. P_{it} is the closing market price of IPO *i* on the 30th trading day and R_m is the market return calculated for the same period, using the respective market's value-weighted price index.

Following explanatory variables are selected based on the mainstream IPO literature, our observation on Arabian Gulf markets, and data availability.

Beta: this is the *ex-post* measure of IPO's market risk factor calculated by using market model time series regression with weekly returns over 52 weeks (one year) following IPO listing. The beta estimate is adjusted for thin-trading effect by using Dimson (1979) method with three lag and lead returns. This variable has emerged from the background discussion of this paper that leads to our test hypothesis.

Log_Size: this is natural log of the size of public offer measured by the gross issue proceeds, which is calculated as the number of shares in offer times the offer price. This variable is used in literature as proxy measure of IPO ex-ante uncertainty. For example, Beatty and Ritter (1986), Clarkson and Merkley (1994), McGuiness (1992) are among others.

Log_Age: this is the natural log of the number of days between the date of company incorporation and the date of listing. This variable is used in literature as a proxy measure of IPO ex-ante uncertainty. David (2002), Kirkulak and Davis (2005), Islam, et. al., (2010) are among others.

Urp: this is the measure of issue underwriters' reputation estimated by examining the tombstones placed in the financial section of local newspapers. We examined how many times a particular investment banker worked as the lead/co-lead underwriter since its incorporation. The higher the frequency as lead or co-lead underwriter the higher is the reputation. The frequency has been divided by the age (years) of the banker in order to get adjusted reputation score. After preparing an adjusted score table we have classified them into four reputation class (Outstanding, Very High, High, and Low). This variable is widely used by researchers as proxy for IPO uncertainty. For example, Beatty and Ritter, Cater and Manaster (1990) and Johnson and Miller (1988) among many others.

Retn: this variable measures the percentage of total equity retained by the existing owners after share floatation. This variable is suggested by Leland and Pyle (1977) and Grinblatt and Hwang (1989) to examine signaling hypothesis of IPO underpricing and is found significant in many empirical studies.

Sub: this is the level of IPO subscription on the day of public offer, which measures the market demand of IPO shares. It has been argued that IPO initial return usually depends on the level of market demand and many studies have found significantly positive relationship between the level of initial return and the degree of oversubscription. Among the most recent works, McGuinnes's (2009) paper is notable.

Fin: this is a dichotomous variable. FIN = 1 if IPO is listed under Financial Services category, else FIN=0. About 36 percent of the sample includes IPOs listed under Financial Services sector. Therefore, it is needed to control for sample bias (if any).

Crisis: this is a dichotomous variable. CRISIS = 1 if IPO is listed during recent global financial crisis period (period after July 2007), else CRISIS = 0. We observed that IPO activities and marker performance in the Gulf region are very sluggish. Therefore, it is needed to control for abnormal sample period.

A number of regression tests are conducted using the above variables in order to examine the relationship between the levels of underpricing and IPO firms' aftermarket risk. The first set of test models specified to measure the marginal effect of aftermarket risk on the level of initial underpricing as follows:

$$MAIR_{i1} = \alpha + \beta_1 BETA_i + \beta_2 LOGSIZE_i + \beta_3 LOGAGE^i + \beta_4 URP_i + \beta_5 RETN_i + \beta_6 SUB_i \quad \beta_7 FIN_i + \beta_8 CRISIS_i + \varepsilon_i \qquad (3)$$

This model is estimated by using full sample and sub-sample data and the relevant results are presented in Table 3 and Table 4 respectively. The consistency of the results is also tested by replacing the $MAIR_{i1}$ with $MAIR_{i30}$. Since there is no confirmed prior knowledge about the direction of relationship between IPO underpricing and aftermarket risk, we tested another model as follows.

$$BETA_i = \alpha + \beta_1 MAIR_{i1} + \beta_2 LOGSIZE_i + \beta_3 LOGAGE^i + \beta_4 URP_i + \beta_5 RETN_i + \beta_6 SUB_i \quad \beta_7 FIN_i + \beta_8 CRISIS_i + \varepsilon_i \qquad (4)$$

This model is also estimated by using full sample and sub-sample data and the relevant results are presented in Table 5 and Table 6 respectively

Samples and Data

The sample includes 147 IPOs listed on seven stock markets of six Arabian Gulf countries during the period from January 2003 to February 2010, which covers about 21.45 percent of all securities listed on these markets as on February 2010. The sample characteristics showed that 53 IPOs are listed under Financial Services sector, which comprises about 36 percent of the sample. This is followed by 17 IPOs (12 percent) listed under Oil and Gas sector, 16 (11 percent) under Industrial Manufacturing sector, 12 (eight percent) under Real Estate sector and 9 (six percent) in respectively construction and transport sectors. Overall it shows that samples are somewhat dominated by the IPOs listed under Financial Services sector, through total sample has representation from all the major industrial sectors in the Arabian Gulf countries.

Table 1: Industry Distribution of IPOS Across the Six Arabian Gulf Countries over the Period from 2003 to 2010

Industry Sector	Saudi Arabia	UAE	Kuwait	Qatar	Oman	Bahrain	Total
Agriculture		1					1
Construction	1	5	1		1	1	9
Consumer Goods	1					1	2
Education	1						1
Financial Services	30	12	2	4	2	3	53
Food and Beverages	4	1		1			6
Health Care	2						2
Industrial Manufacturing	8	2	2	1	1	2	16
Leisure and Tourism	1					1	2
Media	1						1
Mining and Metals	1						1
Oil and Gas	9	2	2	3	1		17
Power and Utilities		1			4		5
Real Estates	3	6		1		2	12
Retail	2						2
Services	1						1
Telecommunications	4	1		1	1		7
Transport	1	4	3	1			9
Total	70	35	10	12	10	10	147

A total of 685 companies listed on the exchanges of six Arabian Gulf countries as of February 2010. Therefore, the sample size covers about 21.45 percent of the total market size in terms of number of listings while it covers about 35 percent of the market in terms of total capitalization value. About 48 percent of total sample is from Saudi Arabian market, which is the largest market in the region with a total listing of 140 companies. Although Kuwait is the second largest market in the region we are able to get only 10 IPO data from the database

The country distribution presented in Table 1 shows that a total 70 IPOs belong to Saudi Arabia, which covers about 48 percent of the sample. This is followed by 35 IPOs from United Arab Emirates, comprising about 24 percent of the sample. The remaining 42 IPOs are from four countries: Kuwait, Bahrain, Qatar, and Oman that accounts for the remaining 28 percent of the sample. The general distribution of sample indicates that a major fraction of the samples are from the Saudi Arabian market which is the largest market (in terms of the market capitalization and number of securities) with in the region. Although Kuwait is the second largest market, we are unable to get enough samples for this market from the database. For other markets the respective samples covers 20 to 25 percent of their total market size. The required data for the samples are extracted from various sources that includes the databases of the respective stock markets, Gulf base, and Sharjah University's digital library.

EMPIRICAL FINDINGS

Results presented in Panel A of Table 2 show that average underpricing, measured by market adjusted initial return (MAIR), in the Arabian Gulf region is over 250 percent on the day of listing. The level of

underpricing appeared to be over 248 percent if MAIR is computed on the 30th day after listing. Both the measures of underpricing, $MAIR_1$ and $MAIR_{30}$, provide the evidence of very high IPO underpricing in the Arabian Gulf markets. This new finding is comparable with the similar high underpricing found in China (see Loughran, *et. al*, 1994 for IPO underpricing in different international markets). Also it is consistent with the another finding based on 47 IPOs from the same region that is reported by Al-Hassan, *et al*. (2010) While average underpricing is very high in the Arabian Gulf region, wide variations are also observed from the high average standard deviation (about 300 percent).

Table 2: Characteristics of IPO Underpricing in Arabian Gulf Countries over the Period from 2003 to 2009

Panel A: Descriptive Statistics for Underpricing Across the Arabian Gulf Region		
	$MAIR_1$	**$MAIR_{30}$**
Average	250.17	248.26
Standard Deviation	297.07	332.77
Median	133.57	125.42
Maximum	1,430.00	1,720.00
Minimum	-30.00	-37.00
Panel B: IPO Underpricing in Different Industrial Sectors		
Industry Sectors	**$MAIR_1$**	**$MAIR_{30}$**
Agriculture	0.01	1.70
Construction	89.50	87.00
Consumer Goods	130.40	118.55
Education	178.46	151.92
Financial Services	394.86	415.33
Food and Beverages	157.44	134.20
Health Care	15.33	7.80
Industrial Manufacturing	117.50	62.47
Leisure and Tourism	-5.25	-13.62
Media	106.50	57.61
Mining and Metals	52.50	28.75
Oil and Gas	216.56	221.69
Power and Utilities	168.93	124.26
Real Estates	226.03	245.86
Retail	31.48	-3.01
Services	126.14	113.64
Telecommunications	133.59	137.31
Transport	175.44	113.32
Panel B: Level of Underpricing in Different Arabian Gulf Countries		
	$MAIR_1$	**$MAIR_{30}$**
Saudi Arabia	283.89	297.80
United Arab Emirates	287.62	263.51
Kuwait	246.13	224.90
Qatar	264.97	248.68
Oman	57.84	41.93
Bahrain	21.40	8.09

MAIR stands for market adjusted initial return that measures the level of IPO underpricing after adjustment of market return over the period from the day of offer opening to the listing day (or 30 day after listing). We used respective market's value-weighted price index to calculate market returns. $MAIR_1$ measures the level of underpricing on the listing and $MAIR_{30}$ measures the underpricing on 30-day after listing.

The underpricing levels of different industrial sectors presented in the Panel B of Table 2 show that underpricing level in the Financial Services sector is around 400 percent ($MAIR_1$ is 394 percent and $MAIR_{30}$ is 415 percent) which is far larger than the level of underpricing in other sectors. This result seems to reflect the effects of regional financial sectors boom during the recent past period. Since 2003 a total of 53 IPOs have been floated in the market comprising nearly 36 percent of the sample. Among other industrial sectors, the average underpricings of Real Estate and Oil & Gas sectors are found to be 226 and 217 percents respectively.

In other sectors, the average underpricing varies from 100 to 200 percent with a few exceptions. Results also depict variations of underpricing across the different markets of Arabian Gulf area. The Panel C of Table 2 shows that average underpricing of two smaller markets, Bahrain (21.40 percent) and Oman (57.84 percent), are much lower than those of the other four markets.

Having examined the characteristics of IPO underpricing, we have tested ten regression models to determine the relationship between the level of underpricing and the aftermarket risk (beta) of the newly listed stocks. Models 1 and 4 applied univariate tests using the aftermarket risk (IPO stock's aftermarket beta) as the sole explanatory variable. Results show that BETA significantly affect the IPO initial underprcing measured on the day of listing ($MAIR_1$) as well as that is measured on the 30_{th} day after listing ($MAIR_{30}$). It is also found that BETA alone can explain about 6 percent of $MAIR_1$ and 5 percent of $MAIR_{30}$. Model 2 employs multivariate tests by including all the selected explanatory variables to measure their effect on the level of initial underpricing measure by $MAIR_1$.

The multivariate test results of Model 2 that presented in Table 3 show that BETA positively affect the $MAIR_1$ and the coefficient is significant at 5 percent level. Among other variables, the offer size (LOG_SIZE), age of IPO companies (LOG_AGE), and underwriter reputation (URP) have significant negative relationship with level of initial underpricing. These variables could explain about 29 percent of initial underpricing in the Arabian Gulf markets. Results of Model 5 also show that same variables significantly affect the level of underpricing measured on the 30^{th} day after IPO listing, and all variables together explain about 31 percent of $MAIR_{30}$.

The Models 3 and 6 used step-wise regression method to determine the most relevant variables to explain the underpricing level on the day of listing as well as on the 30^{th} day after IPO listing. It is found that all the significant variables of Models 2 and 5 remain significant as before, and additionally the issue subscription appears to be significant. The adjusted R^2 increases to 35 and 36 percent respectively for Model 3 and Model 6. Overall the results of Models 1 through 6 demonstrated that the IPO aftermarket risk measured by stock's beta has significant positive relationship with the level of initial undepricing, and thereby the null hypothesis is rejected.

The consistency of results is tested by estimating another set of four regressions with different sub samples, and results are presented in Table 4. The results of Model 5 that used 70 Saudi Arabian IPO data showed that BETA is significant at one percent level. Among the other variables, LOG_SIZE, LOG_AGE, URP, and FIN are significant at five and ten percent levels. The results of Model 6 that used 35 UAE IPO data showed that BETA is significant at ten percent level. Among the other variables, LOG_SIZE, LOG_AGE, URP, and CRISIS are significant. The BETA variable also appears to be significant in the Model 7 that uses 77 IPO data from the Arabian Gulf region except Saudi Arabia. Same results are also revealed in Model 8 that used IPO data from all countries except Saudi Arabia and UAE.

Table 3: Full sample regression results with MAIR as Dependent variable (N = 147)

	$MAIR_1$ as Dependent Variable			$MAIR_{30}$ as Dependent Variable		
Explanatory Variables	**Model-1**	**Model -2**	**Model -3**	**Model -4**	**Model- 5:**	**Model- 6:**
constant	1.44 (2.35)**	7.18 (5.10)***	7.25 (7.49)***	1.66 (2.36)**	8.04 (5.06)***	8.13 (6.35)***
beta	1.04 (1.97)**	1.13 (2.05)**	1.19 (2.23)**	0.78 (1.72)*	0.94 (2.35)**	1.13 (2.46)**
log_size		-1.25 (-3.50)***	-1.42 (-4.45)***		-1.61 (-4.01)***	-1.44 (-3.70)***
log_age		-0.80 (-3.60)***	-0.90 (-4.37)***		-0.91 (-3.67)***	-0.90 (-3.63)***
urp		-0.35 (-2.05)**	-0.35 (-2.09)**		-0.41 (-2.12)**	-0.40 (-2.10)**
retn		-0.011 (-0.81)			-0.001 (-0.08)	
sub		0.004 (1.58)	0.004 (1.91)*		0.004 (1.53)	0.005 (2.02)**
fin		0.62 (1.20)			0.78 (1.34)	
crisis		-0.24 (-0.56)			-0.62 (-1.26)	
f value	3.77**	7.6***	11.70***	2.96*	8.28***	12.44***
adjusted r^2	0.06	0.29	0.35	0.05	0.31	0.36

*The dependent variable $MAIR_1$ is the market adjusted initial return on the 1st day of IPO listing, and $MAIR_{30}$ measures the market adjusted initial return on the 30th day after listing. Among the explanatory variables, BETA is the measure of IPO stock's market risk factor calculated over the one year in aftermarket period. LOG_SIZE is the natural log of the offer size measured by the number of shares in offer times the offer price. LOG_AGE is the natural log of the age of the company measured by the time period between the day of incorporation and the day of exchange listing. URP is the measure of underwriters' reputation. RETN is that percent of ownership retained by the existing directors following share floatation. SUB is that issue subscription times relative to the offer size. FIN is a dichotomous variable where FIN = 1 if IPO is listed in Financial sector, else FIN = 0. CRISIS is a dichotomous variable where CRISIS =1 if IPO is listed during financial crisis period (after July 2007) else CRISIS = 0. Numbers in parentheses shows the t-values of respective co-efficient. Asterisks ***, **, and * denote the level of significance at respectively 1, 5, and 10 percents.*

Finally, results presented in Table 4 depicts that BETA is consistently significant in all markets, while some variation occurs with respect to other variables. For example, CRISIS variable is not significant in Saudi Arabia but it is highly significant in UAE and other regional markets. This is indeed an interesting to find that the global financial crisis did not affect the Saudi Arabian market while it significantly affected the UAE market. It suggests that Saudi Arabian market is somewhat insulated from global economic upheavals.

The ownership retention by the founding directors is not significant in the Saudi Arabia and UAE, suggesting that IPO signaling hypothesis is not very useful in these markets. In addition, LOG-SIZE and URP variables are only significant in Saudi Arabia and UAE. Since BETA is consistently significant in all the six countries, we can accept the alternative hypothesis that suggests a positive relationship between the initial underpricing and aftermarket risk.

Therefore, this study confirms that aftermarket risk is positively related to IPO underpricing in the non-tax economies of Arabian Gulf countries that provides support to similar findings by Gleason, *et. al,* (2008) in the US market. Finally, findings suggest that underwriters and/or issuers may need to consider IPO aftermarket risk in determining the offer price. This suggestion is pertinent because aftermarket risk may be important for the investors who want to purchase IPO shares from public offers and/or from aftermarket trading.

Table 4: Sub-sample Regression Results with $MAIR_1$ as Dependent Variable

Explanatory Variables	Saudi Arabia (n = 70)	United Arab Emirates (UAE) (n = 35)	Arabian Gulf Region Excluding Saudi Arabia (n = 77)	Arabian Gulf Excluding Saudi Arabia and UAE (n = 42)
	model 7	model 8	model 9	model 10
constant	1.99 (0.51)	7.28 (2.64)***	7.05 (3.74)***	7.54 (3.87)***
beta	1.78 (2.70)***	0.23 (1.88)*	0.42 (2.00)**	1.46 (1.99)**
log_size	-1.36 (-2.51)**	-3.33 (-2.72)***	-0.14 (-0.24)	-0.23 (-0.42)
log_age	-0.65 (-2.31)**	-0.24 (1.87)*	-0.86 (-2.32)**	-1.04 (-2.42)**
urp	-0.16 (-1.66)*	-0.22 (-2.12)**	-0.18 (-0.72)	-0.30 (-1.41)
retn	0.05 (1.35)	-0.037 (-020)	-0.01 (-2.65)***	-0.01 (-3.49)***
sub	-0.00 (-0.014)	0.05 (2.44)**	0.01 (1.88)*	-0.00 (-0.86)
fin	1.68 (1.72)*	-0.86 (-1.23)	0.32 (0.50)	0.30 (0.44)
crisis	0.18 (0.33)	-2.11 (4.77)***	-1.34 (-1.97)**	-0.88 (-1.33)
f value	7.97***	8.78***	3.69***	3.49***
adjusted r^2	0.451	0.39	0.20	0.37

*The dependent variable $MAIR_1$ is the market adjusted initial return on the 1st day of IPO listing, and among the explanatory variables, BETA is the measure of IPO stock's market risk factor calculated over the one year in aftermarket period. LOG_SIZE is the natural log of the offer size measured by the number of shares in offer times the offer price. LOG_AGE is the natural log of the age of the company measured by the time period between the day of incorporation and the day of exchange listing. URP is the measure of underwriters' reputation. RETN is that percent of ownership retained by the existing directors following share floatation. SUB is that issue subscription times relative to the offer size. FIN is a dichotomous variable where FIN = 1 if IPO is listed in Financial sector, else FIN = 0. CRISIS is a dichotomous variable where CRISIS =1 if IPO is listed during financial crisis period (after July 2007) else CRISIS = 0. Numbers in parentheses shows the t-values of respective co-efficient. Asterisks ***, **, and * denote the level of significance at respectively 1, 5, and 10 percents.*

The above findings by using BETA as explanatory variable may be criticized as only 'prima facie' evidence, because the direction of relationship (causality) between the aftermarket risk and underpricing needs separate in-depth study. However, this study assumes that the IPO aftermarket risk may have effect on the level of underpricing. This is because prior evidence has shown that market uncertainty for new stocks does not fully resolve on the day of listing, and in the light of Hamada's (1972) theory, the IPO firm's inherent business and financial risk may have a connection to the aftermarket stock's beta. Hence, the level of aftermarket risk may affect the underpricing.

Alternatively, it can also be analyzed that underpricing can be a useful indicator of the aftermarket risk as suggested by Gleason, *et. al*. (2008). Therefore, we re-run the multivariate test models by using aftermarket risk (BETA) as the dependant variable and underpricing (MAIR) as the explanatory variable. The selected ex-ante uncertainty proxy variables are also included in new regression models as the control variables, because the ex-ante uncertainty may also influence the aftermarket risk.

The results of the models 11 and 12 presented in Table 5 depict that $MAIR_1$ LOG_SIZE, and FIN variables affect the BETA while the other variables are insignificant. The explanatory power of these new models appeared to be only 9.5 and 10 percents respectively, which are far lower than those of the models 2 and 3 in Table 3 that used BETA as explanatory variable.

The results of the models 13 and 14 that used underpricing at the 30th day after listing ($MAIR_{30}$) also reveals similar findings. In addition, the sub-sample results of the models 15 through 18 presented in

Table 6 depict that initial underpricing consistently affect the aftermarket risk (BETA) in all the Arabian Gulf markets, although the explanatory powers of these models are far lower than those of the models 7 through 10 in Table 4 that used BETA as explanatory variables.

Table 5: Full sample regression results with BETA as Dependent variable (N = 147)

Explanatory Variables	Model-11 All Variables Except $MAIR_{30}$	Model -12 Most Relevant Variables From Model 11	Model -13 All Variables Except $MAIR_1$	Model -14 Most Relevant Variables From Model 13
constant	0.17 (0.68)	0.38 (2.75)**	0.23 (0.91)	0.40 (2.84)
$mair_1$	0.0003 (2.05)**	0.0003 (2.19)**		
$mair_{30}$			0.0002 (2.35)**	0.0002 (2.41)**
log_size	0.20 (3.44)***	0.21 (3.73)***	0.20 (3.32)***	0.21 (3.63)***
log_age	0.01 (0.35)		0.01 (0.20)	
urp	0.02 (0.62)		0.02 (0.55)	
retn	0.002 (0.89)		0.001 (0.76)	
sub	0.0006 (1.53)		0.0006 (1.63)	
fin	0.15 (1.73)*	0.15 (1.90)*	0.15 (1.78)*	0.16 (2.03)**
crisis	0.06 (0.81)		0.06 (0.88)	
f value	2.72***	5.87***	2.45**	5.15***
adjusted r^2	0.095	0.10	0.082	0.09

*The dependent variable BETA is the measure of IPO stock's market risk factor calculated over the one year in aftermarket period. Among the explanatory variables, $MAIR_1$ is the market adjusted initial return on the 1st day of IPO listing, and $MAIR_{30}$ measures the market adjusted initial return on the 30th day after listing LOG_SIZE is the natural log of the offer size measured by the number of shares in offer times the offer price. LOG_AGE is the natural log of the age of the company measured by the time period between the day of incorporation and the day of exchange listing. URP is the measure of underwriters' reputation. RETN is that percent of ownership retained by the existing directors following share floatation. SUB is that issue subscription times relative to the offer size. FIN is a dichotomous variable where FIN = 1 if IPO is listed in Financial sector, else FIN = 0. CRISIS is a dichotomous variable where CRISIS =1 if IPO is listed during financial crisis period (after July 2007) else CRISIS = 0. Numbers in parentheses shows the t-values of respective co-efficient. Asterisks ***, **, and * denote the level of significance at respectively 1, 5, and 10 percents*

Therefore, the suggestion that initial underpricing may be a useful predictor of aftermarket risk is also supported by our evidence, although the explanatory powers of the test models are lower. Set aside the direction of the relationship, it is confirmed that aftermarket risk and underpricing are correlated in the Arabian Gulf markets. This may imply that IPO underpricing may be needed to compensate for the aftermarket risk in addition to ex-ante uncertainty, and thereby the aftermarket stock beta is higher for the firms that experience a higher level of underpricing - or vice versa.

CONCLUSION

IPO underpricing is known as inevitable because of ex ante uncertainty about the fair valuation of new issue. There is abundance of empirical studies supporting the existence of IPO ex ante uncertainty in different markets across the world. However, some evidence shows that uncertainty also prevails in the aftermarket period - particularly, over the short term period. Recently, it is also documented with the US data that aftermarket risk measured by stock's beta is positively related to the level of underpricing. In this paper, we have examined whether such relationship between the IPO aftermarket risk and underpricing also exist in different markets outside the US.

Table 6: Sub-Sample Regression Results with BETA as Dependent Variable

Explanatory Variables	Saudi Arabia (n = 70)	United Arab Emirates (UAE) (n = 35)	Arabian Gulf Region Excluding Saudi Arabia (n = 77)	Arabian Gulf Excluding Saudi Arabia and UAE (n = 42)
	model 15	model 16	model 17	model 18
constant	1.78 (4.31)***	0.90 (3.12)***	-0.20 (-0.48)	-0.90 (-157)
$mair_1$	0.0003 (2.70)***	0.0003 (1.88)*	0.0002 (2.00)**	0.0009 (1.99)**
log_size	-0.056 (-0.81)	0.39 (2.38)**	0.36 (3.59)***	0.34 (2.93)***
log_age	0.002 (0.05)	-0.05 (-0.47)	0.014 (0.17)	0.14 (1.27)
urp	-0.004 (-0.14)	0.05 (0.35)	0.04 (0.82)	0.034 (0.65)
retn	-0.011 (-2.72)***	0.01 (1.22)	0.002 (0.49)	0.003 (0.78)
sub	0.001 (0.86)	-0.0004 (-0.07)	0.001 (1.10)	0.011 (1.87)*
fin	-0.19 (-1.62)	0.24 (1.89)*	0.16 (1.20)	0.10 (0.63)
crisis	-0.01 (-0.16)	-0.10 (-0.36)	0.04 (0.31)	0.10 (0.63)
f value	3.59**	2.55**	2.53**	2.16**
adjusted r^2	0.05	0.05	0.16	0.21

*The dependent variable BETA is the measure of IPO stock's market risk factor calculated over the one year in aftermarket period. Among the explanatory variables, $MAIR_1$ is the market adjusted initial return on the 1st day of IPO listing, and $MAIR_{30}$ measures the market adjusted initial return on the 30th day after listing LOG_SIZE is the natural log of the offer size measured by the number of shares in offer times the offer price. LOG_AGE is the natural log of the age of the company measured by the time period between the day of incorporation and the day of exchange listing. URP is the measure of underwriters' reputation. RETN is that percent of ownership retained by the existing directors following share floatation. SUB is that issue subscription times relative to the offer size. FIN is a dichotomous variable where FIN = 1 if IPO is listed in Financial sector, else FIN = 0. CRISIS is a dichotomous variable where CRISIS =1 if IPO is listed during financial crisis period (after July 2007) else CRISIS = 0. Numbers in parentheses shows the t-values of respective co-efficient. Asterisks ***, **, and * denote the level of significance at respectively 1, 5, and 10 percents*

This is important because the existence of such relationship in the different parts of the world may imply that underpricing of public offers would additionally be needed to compensate for aftermarket risk, besides the ex-ante uncertainty risk Hence, we test the relationship between the IPO aftermarket risk and underpricing in the markets of Arabian Gulf countries (Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Bahrain, and Oman) a different economic region outside the US, where personal incomes and capital gains are tax-free. While the direction of relationship (causality) between the aftermarket risk and underpricing is yet to be investigated, we assume that IPO value uncertainty may not be fully resolved until a normal market is established after the listing of stock, and the aftermarket beta may have a link to the IPO firm's business and financial risks that has been inherited from the period before listing.

The empirical examination based on 147 IPOs in the Arabian Gulf markets showed that the average underpricing is about 250 percent. The level of underpricing reported in this study is consistent with the previous finding based on 47 Arabian Gulf IPOs that is reported by Al-Hassan, *et al*. (2010). The regression results consistently depict that IPO aftermarket risk (stock's beta) maintains a positive relationship with the level of initial underpricing in all the markets of Arabian Gulf region. While the causality is yet to be known, based on the assumptions mentioned above, we first test the relationship between aftermarket risk and underpricing by using the stock's beta as the explanatory variables along with other ex-ante uncertainty proxy variables. The results showed that beta significantly affects the underpricing in all the Arabian Gulf markets. The relationship is re-examined by using stock beta as the dependant variable and underpricing as an explanatory variable, along with other ex-ante uncertainty

proxies. These results displayed that underpricing can also affect the aftermarket risk. Hence, in both ways, a significant relationship between the aftermarket risk and underpricing is found to exist in the Arabian Gulf markets. However, the models that include beta as an explanatory variable with underpricing as the dependant variable have more explanatory power than that of the models which include beta as the dependant variable with underpricing as an explanatory variable.

Therefore, this study confirms that a positive relationship between the IPO aftermarket risk and underpricing also exists in the Arabian Gulf countries - an important economic region outside the US where personal incomes including capital gains are tax-free. Since it is found that IPO aftermarket stock beta significantly affects the level of underpricing, with higher explanatory power in the multivariate tests, it may be concluded that underwriters and/or issuers in the Arabian Gulf countries may need to forecast the expected aftermarket risk while determining the offer price. Thereby, the degree of initial underpricing may be a useful predictor of the level of aftermarket risk as it was suggested by an earlier study. Given the present results, the future studies will explore the sources of the positive relationship between the aftermarket risk and underpricing.

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