

Performance of Cross-listed and Local IPOs: Evidence from Alternative Investment Market

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Abstract

This paper examines the short-run pricing performance of 238 IPOs listed on the Alternative Investment Market (hereafter referred as AIM) during the period from 2007 to 2016. This paper measures the short-run pricing behavior of IPOs over the period of first-thirty trading days and finds that IPOs are underpriced by 12.58% on the first trading day which dilutes to 7.57% on the thirtieth trading day. The results show that the level of short-run pricing performance of newly listed IPOs is higher than cross-listed IPOs as these issues may have more uncertainty which results to generate higher abnormal returns. The results also confirm the presence of investors' sentiment, underwriters' prestige, and signaling hypothesis. In addition, most of the proxies related to ex-ante uncertainty are not robust predictors of short-run performance of cross-listed IPOs.

Keywords: Short-run performance, robust regression, cross-listed IPOs, local IPOs, Alternative investment market.

JEL Code: F21, L1, E22

1. Introduction

This is a well-established phenomenon that IPOs are generally underpriced on the first trading day which shows that new issues are sold at a lesser price to the general public (Bakke, Leite, & Thorburn, 2016). Prior studies reported that underpricing of new issues is a pervasive phenomenon that varies across markets and time periods (Brau & Fawcett, 2006). The underpricing of IPOs is the difference between what the 'market' and the 'underwriter' value to the shares of a firm. This anomaly originated propositions and theories that include: (a) winner's curse hypothesis which presumes that asymmetric information causes short-run behavior of new issues (Rock, 1986),

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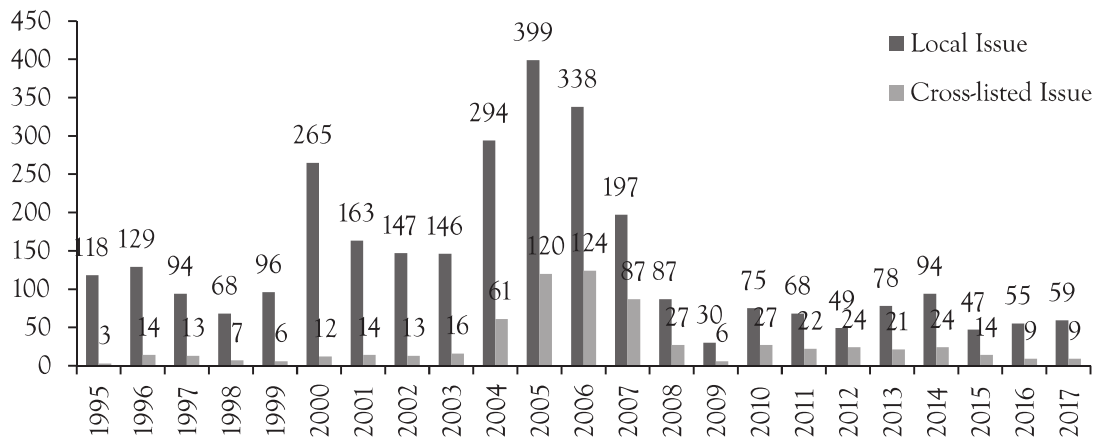
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(b) signaling hypothesis which suggests that firms underprice their IPOs deliberately to leave a good taste in investors' mouths which further compensate uninformed investors to provide them with non-public information (Ritter & Welch, 2002) and (c) ex-ante uncertainty hypothesis which is related to information asymmetry and emphasizes the investment risk faced by prospective investors (Ritter, 1991). Among others, underwriters' prestige, monitoring hypothesis and lawsuit avoidance hypotheses also lead to inflate the level of abnormal returns. In line with this argument, earlier studies analyzed the behavior of IPOs and identify the factors that affect the performance considering different time periods and markets.

Prior studies (see Das, Saha, & Kundu, 2016; Ozdemir, 2017; Sahoo & Rajib, 2010) argued that underpricing during short-run and underperformance phenomena in the long run as is observed globally. This study endeavours to look into the long-run performance of Indian IPOs using monthly returns following event study methodologies. Besides parametric tests, it has also applied wealth relative as a measure of performance of those IPOs. The article documents positive long-run average abnormal returns for Indian IPOs, unlike other countries. However, statistically we fail to reject the null hypothesis of zero abnormal return and therefore conclude existence of no significant long-run underperformance or over-performance in the Indian IPO stocks. In exploring the possible factors which may have bearing in determining the longrun performance of the IPOs, it is observed that book-to-market value (BMV identified various models that were developed and tested in the first-main market, that is, seasoned equity offerings. A few studies (Amini & Keasey, 2012; Amini, 2013; Khurshed, Kostas, & Saadouni, 2016) compared to the failure rate of small IPOs elsewhere, can be explained by the London dominance of AIM, which favours those financial sector businesses that manage to achieve an IPO. On the flip side, what factors determine the underpricing is still a mystery that yet has not been long-established? and what prospective factors investor should keep in mind while investing in IPOs has not been clarified in entire theoretical and statistical discourse? In this wake, the current study intends to address the basic proposition that if the firm is going for secondary issue in an alternative market, would it have the same consequences? and would all the tested prepositions and theories in main markets applicable in alternative markets? We understand that behavior of the firms listed on London Stock Exchange (LSE) main market and alternative market would be different. A lot of studies have already been conducted measuring the performance of IPOs listed on LSE-main market; however, the literature on AIM is limited. This gap motivates us to construct a discourse on the short-run performance of new issues in an alternative market. This study, thus, empirically examines that how cross-listed and local IPOs behave in alternative markets and what are the determinant factors that cause its performance.

Alternative Investment Market is a sub-market or alternative market of the LSE which was launched on June 19, 1995. Initially, AIM comprised only ten listed companies that were valued collectively at £82.2 million. By the end of 2017, over 1,000 companies are the part of the sub-market, with an average market capitalization of £80 million per listing. AIM has been evolved as an international exchange due to its low regulatory burden. Presently, there are more than 3,700 listed firms including local and cross-listed with a majority of their operations outside the UK in more than 100 countries (Mallin & Ow-Yong, 2010).

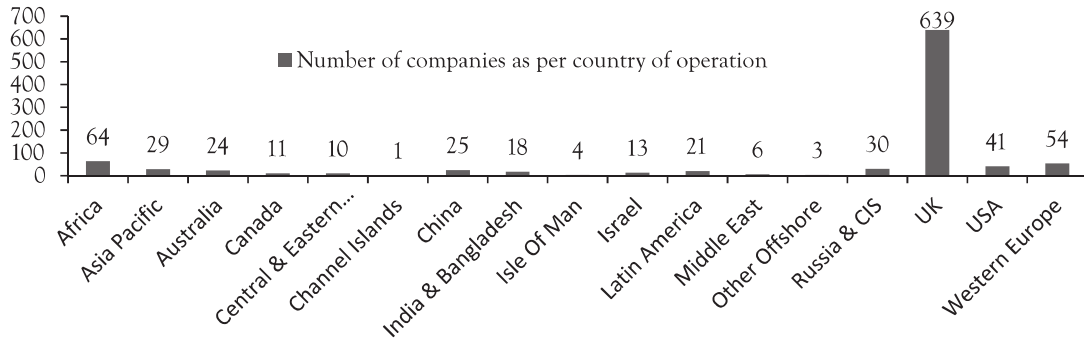


Source: London stock exchange

Figure 1: History of IPOs on AIM

Figure 1 exhibit the position of IPOs floated on the AIM during 1995 to 2017 period. The performance of alternative market is much better as compared to main market. Out of total listing score in UK's capital market, 78% companies gave preference to AIM and listed their securities on it. Only 21.9% companies got listed in main market (Colombelli, 2010). Various factors that are responsible that makes AIM more favor forum as compared to main market. Among others, no specific minimum criterion is required to list securities on AIM which results to lower the post-listing IPOs risk, firms are not bound to disclose their particular historical performance at the listing time and no minimum capital requirements (Colombelli, 2010).

Figure 2 presents the country-wise position to trade IPOs on the AIM. Prior literature has widely documented fruitful economic outcomes of cross-listing such as: (a) reduces the cost of capital, (b) extends the stockholder base (Karolyi, 2012), (c) provides more liquidity as well as diversified pool of investment (Peng & Su, 2014), and (d) enhances firms' visibility, and (e) exposure to participants of local & international investors. Despite the sizable literature on main IPO market, there is a dearth of research focusing on the second markets. This aspect motivates us to analyze the short-run behaviour of IPOs listed on the alternative markets and what are the preconditions



Source: London stock exchanges

Figure 2: Trend of Cross-listing All Over the World

tors that cause their performance.

2. Empirical Evidences on Short-run IPO Performance

In literature, it has been claimed that on average, IPOs are underpriced, which usually exist in almost all the countries indicating that market price is higher than offer price. To identify different factors that affect the short-run performance, different models have been developed and tested in almost all the markets, for example, the winner's curse hypothesis, underwriter's reputation, ex-ante uncertainty and signaling hypothesis. The empirical evidences found that the magnitude of pricing performance varies from market to market.

Previous studies reported that short-run performance in the developed market was approximately 18%, e.g. in the US market it was only 11% (Reilly & Hatfield, 1969) during 1960s. During 1980 to 1990 period, it was about 7% while it was almost double, i.e. 15%, during the period from 1990 to 2000. It was reported roughly 12% abnormal returns in the US market during the period from 2001 to 2008. Similarly, in UK market, initial performance was documented at 19% during 1989-2007 for instance (Chambers & Dimson, 2009). Coakley, Hadass, & Wood, (2009) considered a unique sample of 591 IPOs issued on the LSE for the period 1985–2003 and found that on an average short-run performance of 10.5%. They also observed the features of bubble period which indicates significant increase in short-run pricing performance in this period suggesting money left on the table, and a decline in operating quality. They recognized that venture capitalists and reputable underwriters as the major contributors towards IPOs performance.

The level of short-run performance is higher in the emerging and developing economies. Prior literature has documented that IPOs underpricing in the emerging markets was approximately about 23-25%. Perera & Kulendran (2016) documented that on average of 25.47% short-run performance using 254 IPOs over the period from

2006 to 2011 in Australian market. In this study, they reported 24.63%, 24.06% and 23.34% cumulative abnormal returns (CARs) in third, sixth and tenth day of trading of shares respectively. Meanwhile, Clarke, Khurshed, Pande, & Singh (2016) reported on an average 23% abnormal returns on the listing day using 362 IPOs from 2003 to 2014. Their findings supported the voluntary short-run pricing performance by the underwriters and market sentiment hypothesis. Ghosh (2014) reported that on an average initially IPOs are underpriced by 95.86% considering 1,842 Indian companies listed on the Bombay Stock Exchange from 1993 to 2001. This study further split short-run performance into two categories, i.e., boom (66.64%) and slump (316.13%) periods. This reflects that uncertainty played an important role in creating perverse phenomenon of short-run pricing performance in India. IPOs with a large issue size and those went for seasoned offerings had less short-run performance (Zaremba & Szyszka, 2014).

Likewise, Ritchie, Dimovski, & Deb (2013) also studied on the performance of infrastructure IPOs in India from 2004 to 2010 and reported that on an average IPOs are underpriced by 25.4%. They identified that oversubscription, government ownership and issue size are the robust determinants of short-run performance. Another recent attempt in Indian market has been made by Gupta & Suri (2017) who identified on an average underpricing of 34.05% and overpricing of 32.04% using the sample of 292 IPOs listed from 2004 to 2013. Mayur & Mittal (2014) reported average initial performance of 103.25% in Indian stock market during the period of 2000 to 2010. Furthermore, they have also analyzed relationship between after IPO performance deterioration and behavior of IPOs by dividing the sample into two groups (i.e. low and high pricing performance). They reported that overall performance of both groups has deteriorated but their trend was insignificantly different. To enhance the access of small and medium industry, Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) launched platform for public offering.

To evaluate the pricing performance by Dhamija & Arora (2017), they found underpricing of 10.73% which is low as compared to IPOs listed on the main board stock exchanges in India. They also reported different type of offer, size of issue, promoters' holding, oversubscription, prestige of lead managers and the listing of stock exchanges are the key factors which affects the short-run performance of SMEs in Indian market. In the continuity of these cited articles, Bansal & Khanna, (2013) examined the performance of 320 IPOs listed at Bombay Stock Exchange. To find the determinants, they applied vector autoregressive (VAR) analysis. The relationship between issue sizes, firm's age, and book-building mechanism was negative and statistically significant. In addition, they also identified positive association between oversubscription, market capitalization, and number of shares offered.

With regard to earlier studies on Pakistani IPO market, Sohail & Nasr (2007) used 50 IPOs listed on Karachi Stock Exchange (KSE) from 2000 to 2006 and reported that on average, IPOs are underpriced by 35.66%. They found that ex-ante uncertainty, offer size, market capitalization and oversubscription variables as the potential contributors of short-run pricing performance in Pakistani context. Further, extension in literature in the context of IPOs in Pakistani market was made by Mumtaz, Smith, & Ahmed, (2016) using 80 IPOs listed on KSE during 2000-2013. They reported initial returns of 22.08%. In a recent study, Sundarasan, Khan, & Rajangam (2018) documented the lowest level of short-run pricing performance using 228 IPOs from the Malaysian Stock Exchange during 2005–2012. They identified the lowest initial return value (1.227%), and the highest (1.290%) with a mean value of 0.0753%. They found that auditors' and underwriters' reputation play the significant role in reducing asymmetric information and signals firm value to the potential investors.

Likewise, various attempts have been made to determine the short-run performance of Chinese firms e.g. an average initial return of 462% for 101 IPOs issued in the 1990–1993 period (Mok & Hui, 1998), 231% for 308 IPO issued in the 1985–1995 period (Su & Fleisher, 1999), 175% for 570 IPO issued in the 1993–1998 (Chan, Wang, & Wei, 2004), an average short-run pricing performance of 123% for 891 IPOs issued during the 1996–2004 (Chang, Chen, Chi, & Young, 2008) and 247% for 1377 IPOs issued in the 1992–2007 (Tian, 2011). A number of hypothesis have been developed to test the determinants of underpricing, for instance, information asymmetry, ex-ante uncertainty, ownership dispersion signaling hypothesis, and underwriter reputation. This generally demonstrates three aspects of literature that include: (a) underpricing' is a pervasive phenomenon which exist in almost all markets, (b) size and magnitude of underpricing varies from market to market, (c) pre-IPO & post-IPO issue's specific characteristics, firm's characteristics and market behavior explains the potential variance in underpricing and short-run performance of IPOs.

3. Methodology and Data

We use 238 IPOs listed on AIM on the basis of systematic random sampling which suggests that every fifth IPO is selected (twenty percent of selected population) from total issues during the period from 2007 to 2016. This study examines the short-run IPO performance over the first, fifteen and thirty trading day. The purpose of measuring pricing performance over the number of days is that stock prices take some time to adjust and reach its equilibrium (Khurshed et al., 2016). To test the performance of IPOs, we calculate market adjusted abnormal return (MAAR) for each firm using Financial Times Stock Exchange (FTSEAIM-100) Index as a benchmark. We follow the methodology of Aggarwal, Leal and Hernandex (1993) to calculate the MAAR as:

$$\text{Market Adjusted Abnormal Return} = \left[\left(\frac{1 + R_{i,1}}{1 + R_{m,1}} \right) - 1 \right] \times 100 \quad (1)$$

where $R_{i,1}$ is the raw return of stock i at the end of first trading day which is calculated as: $R_{i,1} = \frac{P_{i,1} - P_{i,0}}{P_{i,0}}$. $P_{i,1}$ indicates the price of a particular stock i at the end of first trading day, $P_{i,0}$ is the offer price of the same stock. Likewise, $R_{m,1}$ shows the market return which is calculated as: $R_{m,1} = \frac{I_{m,1} - I_{m,0}}{I_{m,0}}$, where $I_{m,1}$ indicates the value of the stock index at the end of first trading day and $I_{m,0}$ value of the stock index at opening of stock market at same day. The market adjusted abnormal return model can be referred to as 'short run IPO performance'. In this study, we measure the behavior of local and cross-listed IPO over the period of first, fifteen, and thirty trading day in alternative market.

We deploy event study methodology to investigate the change in the short-run performance of IPOs as systematic events occurrence. This methodology has been applied in number of corporate events (e.g. demutualization of exchanges, dividend changes, mergers & acquisitions, and stock splits, etc.). According to Mumtaz & Smith, (2015), firstly this methodology was used by Dolley in 1933 for investigating the effects of stock splits on a firm's common stock. In line with this, the studies undertaken by Ball & Brown (1968) Ball and Brown (1968 and Fama, Fisher, Jensen, & Roll (1969) further ensured the implicit and explicit validity and strengthened the reliability of this methodology in the domain of finance. To examine the predictors that influence the IPO pricing in the secondary market, we apply the robust regression technique. The purpose of employing robust regression method is that other techniques have been used by earlier IPOs studies e.g., Ordinary least square (OLS) (Deng & Dorfleitner, 2008; Hahn, Ligon, & Rhodes, 2013; Ibrahim, Mazlina, Azman-Saini, & Zakaria, 2016; Purnanandam & Swaminathan, 2004; Sundarasan et al., 2018), Vector Auto-regressive Analysis (VAR) (Bansal & Khanna, 2013; Basti, Kuzey, & Delen, 2015; Mitsdor & Diederich, 2008) and Extreme Bounds Analysis (EBA) (Mumtaz et al., 2016). These techniques may not provide unbiased results due to the existence of outlier in the sample. OLS, VAR and EBA techniques may not treat the outlying observations in different statistical ways. To overcome the problem of outliers in these techniques, researchers used different methods to detect and remove outliers. Replacement of these observations which are significant in numbers cause biasness and can effects true reflection of data. To overcome and resolve these issues, we use robust regression in this study. Robustness refers to the stability of conclusions in the face of divergent from core assumptions of linearity. In general course of business, this usually means that a smaller change in the distribution of the data does not cause larger changes in the variance of the coefficient (Wilcox, 2012). It can be differentiated from resistance that exhibits the sensitivity of point estimates to outlier. It infers that a outlier can change the value of mean score but cannot change

the median of overall sample (Rousseeuw, Van Aelst, Van Driessen, & Agulló, 2004) we use the minimum covariance determinant (MCD). The median is, thus, a resistant estimator of location. The robustness describes inferential statistics while resistance refers to point estimators, methods that are resistant and usually robust. The resistant point estimators are thus commonly described as robust predictor. To determine the robust predictors, we develop the following model:

$$MAAR_i = \beta_0 + \beta_1 Risk_i + \beta_2 Off_{Price_i} + \beta_3 RoA_i + \beta_4 FinLev_i + \beta_5 UW_i + \beta_6 Mkt_{return_i} + \beta_7 Mkt_{vol_i} + \beta_8 Firm_{Size_i} + \beta_9 Mkt_{Condition_i} + \beta_{10} Off_{Size_i} + \varepsilon_i \quad (2)$$

Robust regression is generally calculated by finding coefficients that reduce the sum of the squared residuals, where, $\varepsilon_i = r_i = y_i - x_i\beta$ as compared to traditional least squares estimator. As a result, error term (residual) go into objective function on right-hand side of Equation (2) after squaring, thus, total effects of the outlying values or observations are exaggerated accordingly. Where MAAR is computed on the first, fifteen and thirty trading day. Similarly, risk is a proxy of the aftermarket risk level of IPOs which is actually standard deviation of price of particular stock. Offer price is the issue price, ROA is a rate of return on assets, Fin-Lev is financial leverage which explains that how much debt is being acquired by firm, and UW refers underwriter's prestige. UW is a dummy variable where the high prestige underwriter is assigned as 1 and 0 otherwise. UW is measured through share of particular underwriter in the total market capitalization raised by these specific issues. We calculate underwriter's prestige by following formula (Jeribi, 2015): $Underwriter's\ Portion_{i,j} = \frac{TIPOS_{i,j}}{\sum_{i=0}^{i=n} TIPOS_{i,j}}$. This study considers the portion of each underwriter for all IPOs in the total amount attracted during the sample period in an alternative market. $TIPOS_{i,j}$ = issued IPO shares of a firm j by underwriter i and $\sum_{i=0}^{i=n} TIPOS_{i,j}$ = total issued IPOs by all selected sample and underwriters. We also calculate the median for the participation of all underwriters for IPO firm j as: $Median_j = Median(Underwriter's\ Portion_{i,j})$. If underwriter i has a value above the median, it is assigned as 1 (i.e. high prestige underwriters), and zero otherwise.

Mkt_return shows the market return and calculated through FTSEAIM index over 45 trading days before to the particular issue, Mkt_volatility shows the market behavior of market and is calculated through standard deviation of market returns for 45 days before the issuance of the particular IPO. Firm Size is taken as total assets of pre-IPO firm, Hot is a dummy variable which depicts hot activity period, if IPOs is issued in hot activity period it is treated as 1, otherwise 0 and Off size is size of IPOs. The purpose of not including other variables (e.g. age of firm, oversubscription, listing delay and post issue promoter holding, etc.) as these may create high biasness due to the fact that age of newly listed firms is small than cross-listed firms. Likewise, other variables may have the same problem with our sample. In general, robust regression is useful to mitigate the potential impact of outlier in the sample. It minimizes the summed value of function of the error term. This function can be explained through

following equation as:

$$\text{Huber Model} \begin{cases} \frac{X^2}{2} & \text{if } |X| \leq c \\ c|X| - \frac{c^2}{2} & \text{otherwise} \end{cases} \quad (3)$$

In the next step, we also use Median Absolute Deviation–Median Centered (MADMED) method:

$$\text{MADMED}, \hat{\sigma}^{(\delta)} = \text{Median} \left[\frac{\text{abs} \left(r_i^{(\delta-1)} - \text{Median} \left[r_i^{(\delta-1)} \right] \right)}{0.675} \right] \quad (4)$$

Maronna & Morgenthaler (1986) defines the robust statistic of robust regression as:

$$R^2 = \frac{\sum_{i=1}^N P_c \left(\frac{y_i - \mu}{\hat{\sigma}\omega_i} \right) - \sum_{i=1}^N P_c \left(\frac{r_i}{\hat{\sigma}\omega_i} \right)}{\sum_{i=1}^N P_c \left(\frac{y_i - \mu}{\hat{\sigma}\omega_i} \right)} \quad (5)$$

Information criteria for M-estimated equations describe the robust equivalent of the Akaike Information Criterion (AIC_R), and a corresponding robust Schwarz Information Criterion (BIC_R):

$$AIC_R = 2 \sum_{i=1}^N P_c \left(\frac{r_i(\beta)}{\hat{\sigma}\omega_i} \right) + 2k \left\{ \frac{\sum_{i=1}^n \psi_c \left(\frac{r_i(\beta)}{\sigma\omega_i} \right)^2}{\sum_{i=1}^n \psi_c \left(\frac{r_i(\beta)}{\sigma\omega_i} \right)} \right\} \quad (6)$$

4. Empirical Findings

4.1 Average short-run performance of IPOs

The short-run performance is examined whether or not the investors obtain abnormal returns over the first, fifteen and thirty trading day? Table 1 exhibits the magnitude of short-run performance of 245 IPOs comprising 188 local and 57 foreign firms listed on the alternative markets. We extract seven extreme values from the sample using spilt sample skewness method. These outliers were replaced by sample mean which make the final sample reduces to 238. This study reports that, on average, IPOs are underpriced by 12.5% on the first listing day. At the end of fifteen trading day, underpricing reduces to 9.83%. Likewise, at the end of thirty trading day, it drops to 7.56%. These abnormal returns are highly significant on the first trading day, however, the significance level deteriorates to 5% on the fifteen and thirty trading day. Interestingly, local IPOs earn higher returns than the cross-listed IPOs. The mean differences of abnormal returns of newly listed and cross-listed IPOs are significantly different on the first trading day. We infer from the results that no mean difference exists in terms of abnormal return of newly and cross-listed on the fifteen and thirty trading day. The estimation of the IPO price is totally based on the behavior and trends of the secondary offer and market prices. The reason behind the mispricing of these issues is due to the informational asymmetries between the prospective investors and the firms floated new issues.

Table 1: Descriptive Statistics (Market Adjusted Abnormal Returns)

	First trading day	Fifteen trading day	Thirty trading day
Newly Listed IPOs	14.508**	10.667*	7.740*
	(21.371)	(16.639)	(12.415)
t stat	3.12	2.09	2.10
Cross-listed IPOs	6.024*	7.018*	6.977*
	(20.671)	(14.813)	(9.843)
t stat	2.081	2.142	2.114
Independent sample t-test for Difference ⁴			
Mean Difference	8.484**	3.649	.7629
t stat	2.584	1.451	.415
Overall Sample	12.583**	9.839*	7.567*
	(21.469)	(16.285)	(11.865)
t stat	3.068	2.015	2.292

This table presents the short-run performance of 238 companies including 54 cross-listed and 184 newly listed in AIM at London Stock Exchange (LSE) from 2007 to 2016. Standard deviation is reported in parenthesis. Skewness adjusted t test is applied to test significance of the equal- and value-weighted market adjusted abnormal return which is equal to zero. * and ** show the significance level at 95% ($p < .05$) and 99% confidence ($p < .01$) respectively.

4.2 Short-run pricing performance by issue year

We examine year-wise short-run IPO performance and the results presented in Table 2 which show that investors earn positive abnormal returns in all the years except 2009. The negative returns are signaling adverse and unfavorable direction of the market. It can be deduced that it was more suitable option for investors to sale out their issue on first trading during 2009 period as they were getting negative return after retaining till 30th day. The prime reason is to get negative abnormal return in 2009 was the financial crisis in 2007 which affected the performance of IPOs in the alternative market. There are different factors but on one side investors may be less curious to take more risk and on the other, there may be negative trend to get positive returns. A year-wise analysis further explored that in the 2008, 2011, 2013 and 2016, the highest level of positive abnormal returns obtained on the first trading day but these returns were drastically changed over the fifteen and thirty trading day. Focus-

⁴ The Independent Samples t-test compares the means of two independent groups to determine whether there is statistical evidence that the associated population means are significantly different.

ing on these results, it is inferred that AIM at London Stock Exchanges exhibited a very strong evidence of short-run performance of IPO which shows the consistency with earlier studies (Acedo-Ramírez & Ruiz-Cabestre, 2016), (Ghosh, 2005; Ritchie et al., 2013).

Table2: Short-Run Performance (Market Adjusted Abnormal Returns) By Issue Year

Year of Listing	N	First trading day	Fifteen trading day	Thirty trading day
2007	29	2.314	1.671	2.771
		(23.569)	(14.250)	(13.020)
2008	6	17.199	2.724	2.563
		(28.703)	(21.830)	(16.622)
2009	3	-33.166	-30.554	-32.169
		(20.569)	(15.250)	(14.020)
2010	15	8.880	6.6365	.9302
		(18.758)	(20.711)	(12.202)
2011	13	21.222	12.068	12.826
		(19.436)	(15.425)	(10.801)
2012	18	12.247	12.964	6.468
		(14.333)	(9.835)	(9.139)
2013	36	19.683	9.763	11.736
		(21.837)	(12.428)	(11.096)
2014	61	10.304	11.516	8.718
		(19.436)	(15.642)	(10.504)
2015	27	5.058	6.225	4.482
		(21.031)	(19.165)	(8.382)
2016	30	24.775	19.581	12.040
		(18.709)	(14.738)	(12.019)

This table exhibits year-wise short-run performance of 238 IPOs including 54 cross-listed and 184 newly listed in Alternative Investment Market during the period from 2007 to 2016. Standard deviation is reported in parenthesis.

4.3 Short-run pricing performance by parental market

Table 3 exhibits that on average, investors yield higher abnormal return on newly listed IPOs in UK local market as compared to the cross-listed IPOs from the developed, emerging and developing markets. Contrary to this, investors earn higher returns on cross-listed IPOs from the emerging and developing markets than

developed market. To measure the significant difference among abnormal returns of IPOs of UK local market, developed market and emerging and developing market, this study used ANOVA technique and their results indicate the significant difference between groups on the first trading day. We also applied 'post hoc test' for further clarification which exhibits that there is significant difference between abnormal returns of local market and developed market. This implies that firms from local, emerging and developing markets 'left more money on the table' as compared to the developed market companies.

Table 3: Short-Run Performance (Market Adjusted Abnormal Returns) by Market of Incorporation

Domicile (Parent Market)	N	First trading day	Fifteen trading day	Thirty trading day	
Local UK Market	184	12.652	9.063	7.461	
		(20.492)	(16.5370)	(11.897)	
Developed Market	36	4.635	4.678	7.571	
		(16.938)	(11.697)	(10.579)	
Emerging and Developing Market	18	5.388	7.242	6.224	
		(21.247)	(14.395)	(8.390)	
Dependent Variable	Domicile (Parent Market)	Domicile (Parent Market)	Mean Difference (Anova) ⁵	Std. Error	Sig.
Market Adjusted Abnormal Return on 1st Day of Trading	Local UK Market	Developed Market	8.017	3.656	.074
		Emerging and Developing Market	7.264	4.954	.309
	Developed Market	Local UK Market	-8.017	3.656	.074
		Emerging and Developing Market	-.753	5.791	.991
	Emerging and Developing Market	Local UK Market	-7.264	4.954	.309
		Developed Market	.753	5.791	.991
		Emerging and Developing Market	1.346	3.316	.913

This table exhibits short-run pricing performance of overall sample of 238 IPOs which includes 184 local listed companies, 36 and 18 firms from the developed and developing economies listed on the AIM from 2007 to 2016. Standard deviation is reported in parenthesis.

⁵ Analysis of variance (ANOVA) is a collection of statistical models and their associated estimation procedures (such as the "variation" among and between groups) used to analyze the differences among group means in a sample.

4.4 Short-run pricing performance by industry-wise

The results show in table 4 that all the sample industries obtain positive abnormal returns on the first trading day. Among all, electrical and automobile industries earn highest abnormal returns of 25% on the first trading day followed by IT, telecom, media, general and construction industry. Alternatively, pharmaceuticals and chemical industry obtained negligible initial day returns, however, these returns gain momentum at the end of thirtieth trading which jumped to 8.18%. This suggests that investors are required to hold their investment which eventually increases their returns. However, in most of the cases abnormal returns show decreasing trends as compared to the event period from first to thirtieth trading days.

Table 4: Industry-Wise Short-Run Performance

Industry	N	First trading day	Fifteen trading day	Thirty trading day
Construction & Material	17	10.147	8.334	3.758
		(19.003)	(14.081)	(13.518)
Financial Sector	36	11.624	10.396	6.346
		(16.754)	(13.410)	(9.592)
Computer & IT	26	13.016	6.424	6.976
		(22.807)	(14.462)	10.333)
Automobile	1	21.590	37.510	19.560
General	75	11.300	8.970	8.477
		(19.869)	(17.334)	(12.781)
Pharmaceuticals & Chemical	27	1.589	5.329	8.182
		(18.095)	(16.569)	(11.149)
Media	10	13.821	10.873	6.058
		(13.445)	(16.010)	(11.369)
Electrical and Electricity	9	25.004	14.753	10.376
		(24.578)	(15.583)	(7.951)
Telecom and Communication	4	14.195	11.973	9.305
		(8.610)	(8.245)	(3.401)
Oil& Gas and Mining	33	10.014	4.236	6.557
		(24.693)	(15.829)	(11.924)

4.5 Short-run performance by underwriters' prestige

There are various measures and proxies have been used for measuring the prestige and repute of underwriters by previous studies. In this study, we follow the underwriter prestige constructed by Carter & Manaster, (1990) and Megginson & Weiss, (1991). Specifically, we consider the number of IPOs underwritten by that underwriter as a proxy for underwriters' prestige. First, we summed that how many IPOs each investment bank has underwritten, and then ranked the underwriters accordingly. Second, we also use the median to divide the whole underwriters into two groups, low and high prestige. Above median value, the underwriter is categorized as a high prestige while less than median is considered as low prestige. Earlier studies documented that the underwriter's prestige affects the short-run performance (Bajo, Chemmanur, Simonyan, & Tehranian, 2016; Chen, Shi, & Xu, 2013; Khurshed et al., 2016; Sundarasan et al., 2018). This in table 5 study found a negative relationship between high prestige underwriters and underpricing due to utilization of resources and capturing all the risk factors by underwriters. These findings are in accordance with finding of prior researches (Bajo et al., 2016; Chen et al., 2013; Khurshed et al., 2016; Mumtaz et al., 2016; Sundarasan et al., 2018). Alternatively, low prestige underwriters result higher level of short-run pricing performance.

Table 5: Short-Run Performance by Underwriters' Prestige

Underwriters' Prestige	N	First trading day	Fifteen trading day	Thirty trading day
Low Prestige	94	30.632	18.615	11.800
		(15.081)	(14.139)	(10.153)
High Prestige	144	-1.997	1.503	4.502
		(10.371)	(12.876)	(11.352)

4.6 Short-run performance on the basis of investors' sentiments

We analyze the short-run performance categorizing the market sentiments and their results are reported in Table 6. To measure the role of investors' sentiment, we use the 45-day cumulative return of that market before the listing day of that particular IPO then classify market sentiments into three categories: lowest returns as bear market, stable returns as bunny market, and highest returns as bull market. The results reflect that IPO short-run performance is positively associated with market sentiments prior to listing day. In case of bear condition, the new issues exhibit on an average overpricing of 9%. However, the situation is different in bunny market condition where new issues are underpriced by 4.5%. Following the prior studies, bull market conditions provides higher opportunities for investors to earn abnormal

returns and in our case investors yield 30.5% on the listing day. This evidence confirms the existence of investor sentiment hypothesis which presume a positive relationship between market sentiment and short-run performance of IPOs (Derrien, 2005; Guo, Brooks, & Fung, 2011).

Table 6: Short-Run Performance by Investor Sentiments

Market Sentiments	N	First trading day	Fifteen trading day	Thirty trading day
Bear (Market Return <0%, > -7.7%)	62	-9.277	-6.281	0.395
		(13.384)	(12.226)	(12.243)
Bunny (Market Return > 0%, <1%)	85	4.523	7.868	7.775
		(3.934)	(10.269)	(9.628)
Bull (Market Return >1%, <6%)	91	30.577	18.538	11.782
		(15.248)	(14.237)	(10.171)

4.7 Short-run performance by size of issue

The available literature has documented the nexus between the short-run performance and size of issue. To measure the effect, we divide our sample into four strata as per market capitalization. Table 7 shows that small firms are less underpriced (8.78%) relative to large firms which are more underpriced (on average 13.53%). This finding is in line with many other studies (Ghosh, 2014; Ghosh, 2005; Mumtaz et al., 2016; Ritchie et al., 2013). However, our findings are contrary to previous studies because the results show that mature firms are more stable having more options to generate funds thereby yielding higher abnormal returns. The probable reason for this finding is that large-sized firms may have more diversification opportunities so they are investing in those possibilities where they obtain higher returns.

Table 7: Short-Run Performance by Size of Issue

Issue Size	N	First trading day	Fifteen trading day	Thirty trading day
(< 11.3925 Million)	60	8.789	3.744	6.670
		(20.236)	(15.372)	(11.487)
(11.3926-27.07 Millions)	58	9.983	11.155	6.977
		(22.371)	(17.294)	(11.976)
(27.08-65.88 Millions)	59	11.182	8.737	7.893
		(17.931)	(13.967)	(9.275)
(65.89-784.15 Millions)	61	13.537	9.495	7.983
		(20.415)	(15.723)	(12.921)

4. 8 Results of robust regressions

To determine the diagnostics for outlier detection, this study uses leverage plots and influence statistics. Appendix I, II and III indicate the existence of outliers in both the independent and dependent variables. To overcome this problem, we employ the robust regression technique. In Table 8, the results show that market risk positively affects the abnormal returns of listing day which illustrates that higher risk prevailing in the market results into generating possibilities of obtaining higher abnormal excess returns. The other finding indicates that offer price is negative and significantly impacts the short-run performance illustrating that higher offer price would result lower level of short-run pricing performance. As we move from first to fifteen and thirty trading days, the significance of the variables disappear which highlight that aftermarket risk and offer price only matter on the first trading day and eventually market prices may move towards its equilibrium. Previous studies also endorsed the similar results (Acedo-Ramírez & Ruiz-Cabestre, 2016). Similarly, ROA is positive and significantly influences the short-run performance on the first trading day. The result of ROA over fifteen and thirty trading days remains the same as the offer price and risk variables. Underwriter's prestige is negatively affects the IPO short-run pricing performance which suggests that higher prestige of underwriters' to employ and utilize more resources to obtain the real offer price, thereby resulting lower the chances of short-run performance (Carter & Manaster, 1990; Chen et al., 2013). We report that market volatility is positively associated with short-run performance which indicates that higher volatility of the market creates higher risk on the part of issuing firms, thus, higher the volatility of stock prices. Market volatility variable is significant at 1% level on the first trading day, however, it deteriorates over fifteenth trading day to 5% level. We find that firm size is positive and significantly affects the short-run pricing performance, thus, larger firms obtain higher abnormal returns. Another argument of this finding is that large-sized firms intentionally underprice their issue as their productivity over the time reduces and if a firm wants to employ an exit strategy, they will offer higher abnormal return. This implies that higher the size of firm, higher the return obtain by investors in an alternative market. This finding is consistent with some other studies (e.g., Mumtaz et al., 2016). The positive effect of hot activity period at the first trading day implies that firms went public during the hot activity period and their pricing performance would be higher. This is due to the reasons that in this mature and stable market, boom period doesn't remain often. In hot activity period, firms may obtain higher market price leaving a large difference between offering and market price on the listing day.

Similarly, the results of cross-listed IPOs show that only market related factors e.g. market volatility and hot activity period are positively associated with short-run

IPO performance. The market volatility indicates that higher volatility of the market creates risk on the part of issuing firms, thus, the chances of short-run pricing performance would be higher. On the other hand, the positive effect of hot activity period on the first and fifteen trading day simply that offshore firms go public during the hot activity period which results to lead higher short-run pricing performance. This study find that variables i.e. after market risk level of IPO, offer size, an offer price are insignificant in offshore listed firms which describes small probabilities of the existence of ex-ante and information asymmetries hypothesis. The underwriter's prestige and firm size positive impact the short-run IPO performance. However, firm related characteristics such as aftermarket risk level of IPO, offer size, ROA, financial leverage and offer size do not emerge as the robust predictors of pricing in offshore/secondary listed firms. The first reason of this kind of finding is secondary offering of the firm which issues shares in other market. The management of firm develops reasonable grounds and framework for this kind of offering. Secondly, the determinants of the IPO's price are based on the estimates of firm related characteristics which have been disclosed through its historical performance in the main market (Ghosh, Petrova, Feng, & Pattanapanchai, 2012), uncertainty is also reduced to its minimal level due to the existence of its net worth (Arik & Mutlu, 2015) and performance. Mispricing in AIM is not due to ex-ante uncertainty and information asymmetry, it is based on the market condition whether it is bull or bear market, firm size (multinational or national level firm) and underwriter's prestige (Abdullah, Jia'nan, & Shah, 2017; Khurshed et al., 2016).

Likewise, the results regarding local IPOs posits that aftermarket risk of IPO, market volatility, firm size, and hot market activity variables emerged as positive and the significant determinants of short-run performance. Alternatively, ROA is negatively affecting the abnormal returns. In the local IPOs, it is found that underwriter's prestige negatively impacts the level of short-run pricing performance. We can infer that underwriter has more information about the overall strength and weaknesses of that specific local firm as compared to cross-listed firm. This also elaborates that due to short period of time with regard to cross-listed IPOs, underwriters do not have enough time to monetize the actual worth of cross-listed firm. On other hand, underwriter may also be known to firm and its management performance of local-UK based organizations. This finding suggests an inverse relationship between underwriter's prestige and IPO pricing (H. C. Chen & Wu, 2015).

This table exhibits the result of robust-regression analysis applied on three categories of IPOs i.e. 174 local IPOs, 53 Cross-listed IPOs and 227 overall IPOs from 2007 to 2016 in Alternative Investment Market (AIM)-London Stock Exchange. Z-stat is reported in parenthesis. The bottom portion of the output displays the goodness-of-

Table 8: Empirical Results of Robust Regressions

	Overall Sample			Cross-listed IPOs			Local IPOs		
	First day	Fifteen day	Thirty day	First day	Fifteen day	Thirty day	First day	Fifteen day	Thirty day
Risk	0.10	0.12	0.06	0.08	0.53	0.12	0.24	0.22	0.19
	(2.51)*	(0.92)	(0.60)	(0.76)	(1.69)	(0.64)	(2.67)**	(2.32)**	(2.27)*
Offer price	-0.01	0.02	-0.02	0.02	0.02	-0.03	0.01	0.01	-0.02
	(1.98)*	(1.25)	(1.42)	(1.69)	(0.69)	(1.89)	(1.33)	(0.68)	(1.11)
ROA	0.17	0.03	0.17	0.09	0.07	0.07	-0.92	-0.64	-0.30
	(2.52)*	(0.14)	(0.94)	(0.46)	(0.12)	(0.20)	(3.44)**	(3.23)**	(1.99)*
Financial Leverage	0.03	-0.06	-0.09	0.00	-0.19	-0.05	0.03	-0.04	-0.11
	(1.26)	(0.64)	(1.29)	(0.05)	(1.13)	(0.52)	(1.04)	(0.37)	(1.74)
Underwriter's prestige	-0.03	-0.02	-0.02	0.04	0.03	0.04	-0.71	-0.66	-0.42
	(1.99)*	(1.97)*	(1.67)	(2.43)**	(2.22)**	(1.97)*	(3.24)**	(3.14)**	(1.98)*
Market Return	-0.01	0.01	0.01	0.01	0.18	0.11	0.05	0.13	0.01
	(1.33)	(0.26)	(0.27)	(0.21)	(1.38)	(1.50)	(2.55)*	(1.71)	(0.10)
Market Volatility	0.06	0.15	0.05	0.53	0.20	0.16	3.29	2.39	0.82
	(2.77)**	(2.29)*	(0.96)	(4.19)**	(3.98)**	(2.17)*	(25.95)**	(4.98)**	(0.29)
Firm size	3.68	2.86	1.04	3.87	2.72	0.88	0.01	0.02	0.02
	(30.21)**	(7.13)**	(3.28)**	(2.72)**	(2.16)**	(1.99)*	(2.91)**	(1.01)	(1.73)
Offer size	0.02	-0.01	-0.02	0.04	0.01	0.01	0.01	-0.00	-0.01
	(3.59)**	(0.26)	(0.36)	(1.45)	(0.07)	(0.24)	(0.97)	(0.01)	(0.40)
Hot	0.05	0.07	0.04	0.07	0.20	0.03	0.58	0.02	0.11
	(3.95)**	(1.82)	(1.12)	(2.42)*	(2.58)*	(0.66)	(4.86)**	(0.42)	(3.85)**
_cons	-13.25	-10.24	-3.69	-13.97	-9.68	-3.11	-11.85	-8.59	-0.18
	(29.89)**	(7.02)**	(3.18)**	(15.99)**	(3.88)**	(2.09)*	(25.66)**	(4.91)**	(0.16)
R2	0.96	0.53	0.20	0.97	0.63	0.43	0.96	0.46	0.34
N	227	227	227	53	53	53	174	174	174

This table exhibits the result of robust-regression analysis applied on three categories of IPOs i.e. 174 local IPOs, 53 Cross-listed IPOs and 227 overall IPOs from 2007 to 2016 in Alternative Investment Market (AIM)-London Stock Exchange. Z-stat is reported in parenthesis. The bottom portion of the output displays the R² goodness-of-fit and adjusted measures. * p<0.05; ** p<0.01 shows the significance effect at 95% and 99% confidence respectively.

fit and adjusted measures. * $p < 0.05$; ** $p < 0.01$ shows the significance effect at 95% and 99% confidence respectively.

Conclusion

The anomaly of underpricing of new issues is generally developed around the propositions i.e. investors' sentiment, underwriters' prestige, informational asymmetries and signaling hypotheses is where firms intentionally left money on table so as to "leave a good taste in investors' mouths" for unseasoned equity offer in main market. This anomaly needs to be investigated with the perspective that if the firm is going public for second time in an alternative market, would it have the same consequences? and would all the tested prepositions in main markets applicable in AIM? For this purpose, we consider 238 IPOs during the period from 2007 to 2016 using systematic random sampling. This study examines the short-run performance and investigate the factors that cause short-run performance over the first, fifteen and thirtieth trading day.

We find the existence of investors' sentiment, underwriters' prestige, and signaling hypothesis in both categories except ex-ante uncertainty in cross-listed IPOs. Our findings are consistent with the prior literature with regards to investors' sentiment (Bajo et al., 2016; Clarke et al., 2016; Mumtaz et al., 2016; Shen, Coakley, & Instefjord, 2013), underwriters' prestige (Chen et al., 2013; Jeribi, 2015; Mumtaz et al., 2016), and signaling hypothesis (Banerjee, Güçbilmez, & Pawlina, 2016; Komenkul, Sherif, & Xu, 2017; Sundarasan et al., 2018). This is a crucial theoretical insight as historical performance-firm's market prestige, its experience and visibility towards contributing higher and lower level of short-run pricing performance in terms of cross-listed IPOs. While there is pool of prior literature focuses on ex-ante uncertainty in the main market. Prior studies related to pre-IPOs risk emphasizes on the importance of uncertainty faced by a firm upon its listing on main market (Peter-Jan, Engelen, Nick, Bailey & Marc, 2013).

We report that genesis of pre-IPOs risk is not only linked with firm's capacity and performance. This may occur due to market regulations (Cattaneo, Meoli, & Vismara, 2015; Tian, 2011), market competitiveness (Derrien, 2005), and industry performance (Purnanandam & Swaminathan, 2004). In an alternative market, a firm will be listed without fulfilling a specific criterion regarding financial track record, trading history, minimum capital requirement and number of shareholders (Colombelli, 2010). The firms especially cross-listed faces least amount of pre-IPOs risk which indicate slow ex-ante uncertainty in an alternative market. Secondly, much has been documented in the domain of post-IPOs risk as market trading risk (Carter & Manaster, 1990), attaining market skills and routine (Ritchie et al., 2013) and learning to deal with an

expanding shareholder base with often conflicting demands (Peter-Jan et al., 2013). These kinds of risks don't matter for cross-listed issues. These results support the risk minimization explanation in an environment in which there is no strict regulations related to pre-requisites and ongoing performance, IPO firms especially cross-listed are still able to minimize their risk and cost of going public.

In a broader context, our results show that self-disciplined markets-LSE's AIM produces different results with regards to IPOs pricing as compared to main market. The logic behind this phenomenon is market regulations; (a) no specific criterion is required to qualify for the listing, (b) firm do not require any financial track record, and (c) no minimum capital is required (Colombelli, 2010). This is the reason that most of the firms that are listed on AIM are SMEs. Considering this, prospective firms can get benefits if they intend to issue their shares in an alternative market by utilizing the results of our study. They should also consider the factors required to minimize the chances of short-run performance. On the other hand, prospective investors will also get benefit in terms of firm's size, market returns, risk factors and market conditions so they invest and obtain abnormal excess returns.

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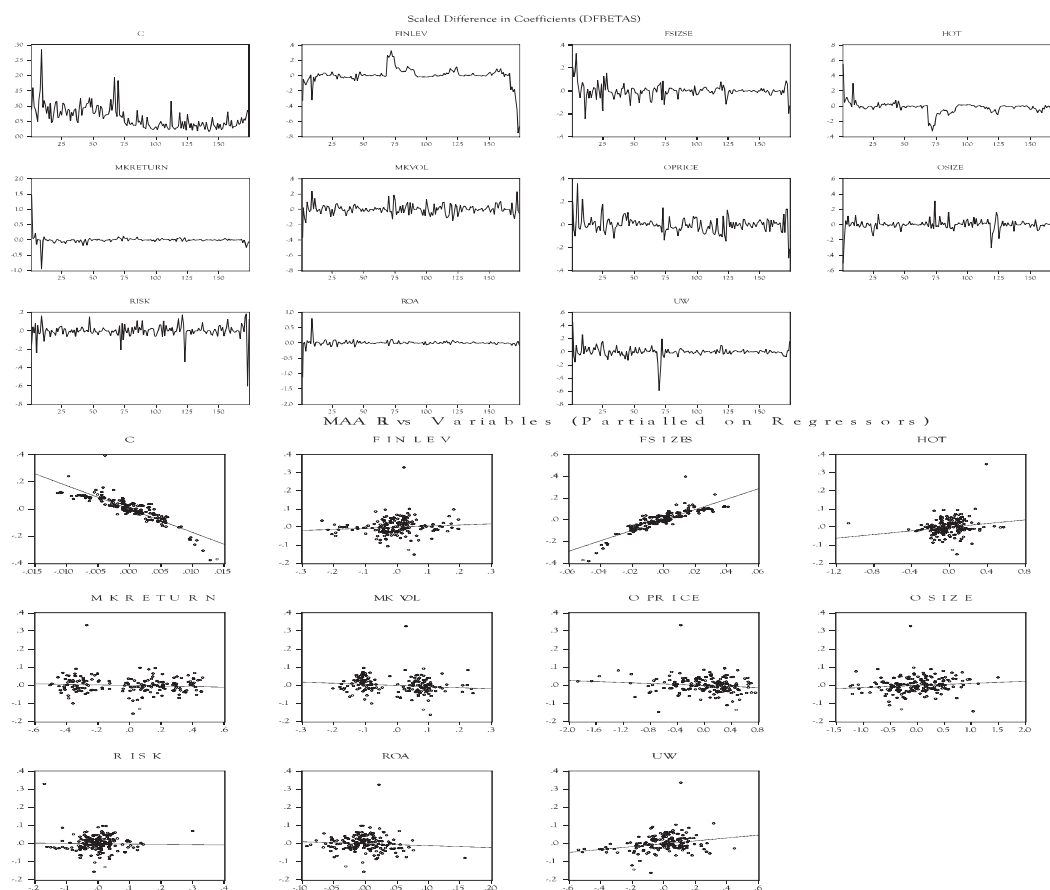
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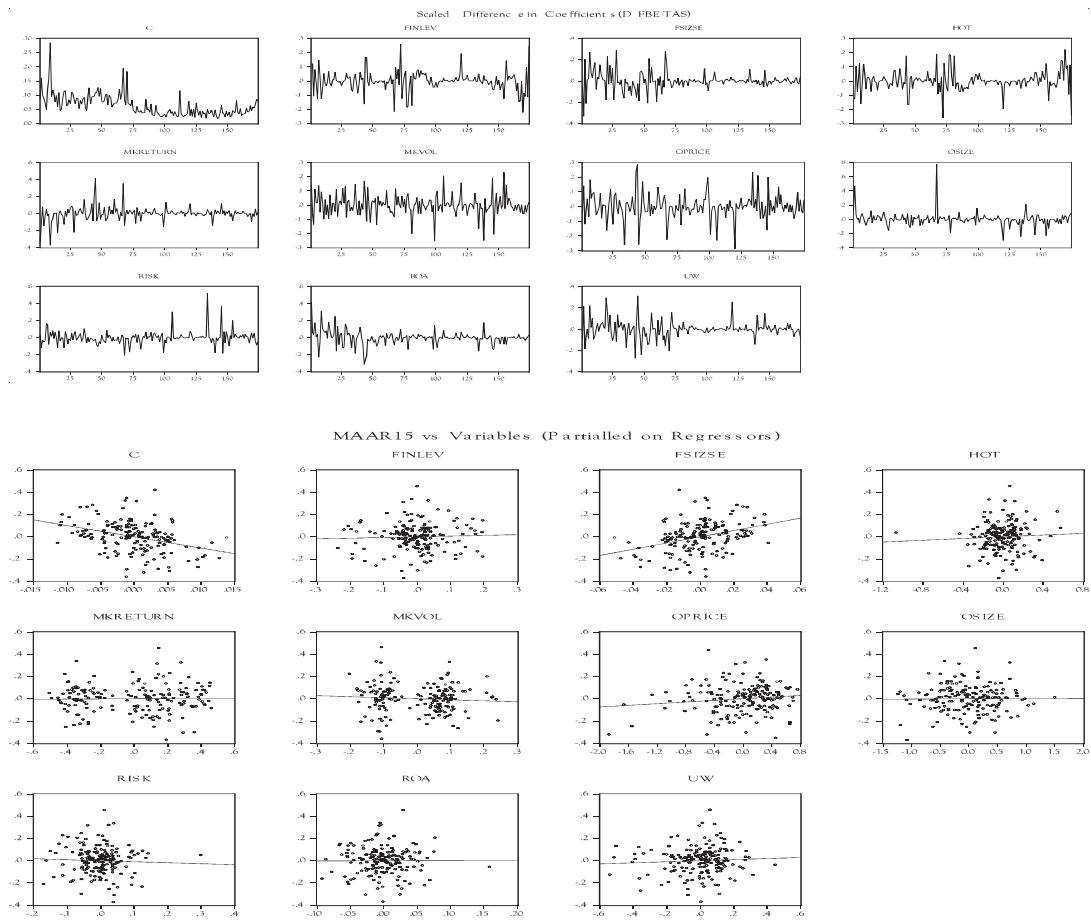
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Appendix I: Result of Influence Statistics and Leverages for Short-Run Pricing Performance Determinants Equation from OLS in Overall IPOs



Appendix II: Result of Influence Statistics and Leverages for Short-Run Pricing Performance Determinants Equation from OLS in Local IPOs



Appendix III: Result of Influence Statistics and Leverages for Short-Run Pricing Performance Determinants Equation from OLS in Cross Listed IPOS

