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PRESENCE OF ANALYSTS BEFORE IPO AND UNDERPRICING: A META-ANALYSIS

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Abstract

In this study, the influence of analyst presence on underpricing produces a different outcome. We discover compelling evidence of the relationship between analyst presence and underpricing of IPOs by combining the results of twelve research involving over 20,400 businesses using meta-analysis. The IPO underpricing grows by 4.9 percent for every one percent increase in analyst presence. Furthermore, a meta-regression between impact magnitude and moderator factors revealed a substantial and favourable influence of a prominent underwriter in increasing the underpricing of the IPO followed by analysts. Our findings are particularly relevant for US market IPOs, as reputable underwriters operate as a moderator and considerably influence underpricing, calling into doubt the US authorities' control over pre-IPO research and attempts to reduce IPO mispricing. However, in emerging markets, underwriter reputation and syndicate have little influence on IPO underpricing.

Keywords: Analyst presence, Information asymmetry, Market efficiency, Underwriter's reputation, Underpricing

1. Introduction

In addition to the material supplied by the issuer firm in their prospectus for the IPO (initial public offering), security analysts supply information to the investors. Analysts' knowledge or signals must decrease information asymmetry and assist potential investors in determining the fair price of the IPO (Roulstone, 2003) and reduce underpricing (Muscarella and Vetsuypens, 1989). Even yet, underpricing is a regular occurrence in the IPO literature. We believe that the presence of analysts prior to the IPO listing improves information quality, sending favourable signals to potential investors. Their inclusion in the underwriter syndicate before to the IPO increases liquidity for the stock on the IPO listing day, albeit at the risk of underpricing or overpricing.

Underpricing is costly to the issuer business, and the issuer would prefer to avoid it through improved discussions with the issue's lead manager. As a result, by employing a renowned underwriter, the issuing business sends a signal of reduced uncertainty (Carter and Manaster, 1990). Underpricing, on the other hand, is the fault of respectable underwriters and their syndicate, which includes co-lead managers and analysts (Dimovski et al., 2010). In comparison to the non-US sample of research, we suggest that the presence of analysts in the underwriters' syndicate enhances investors' trust in the US IPO. Because US authorities prohibit early research and its dissemination to the public in order to minimize manipulations by the underwriters' syndicate, the presence of analysts prior to the issuance of the IPO instils trust in the investor, resulting in increased demand for the share on the IPO's listing day. In contrast, the presence of analysts had no influence on underpricing in the non-US sample.

The purpose of this article is to assess the impact of the IPO's pre-issue analyst presence on the IPO's early results. As a result, our research question is: What are the drivers of underpricing of shares in an IPO when analysts are present prior to the IPO's release? We utilized meta-analysis on the twelve papers to answer this question where one of the independent factors is the existence of an analyst prior to the issue and the dependent variable is underpricing and its influence on the variable "underpricing" was found In this study, the possible endogeneity between the variables underpricing and pre-issue analyst presence is not a reason for worry because underpricing of IPOs happens only on the first day of the IPO (Sahoo, 2014).

Daily et al. (2003) were the first to do a meta-analysis on underpricing in IPO research. More general determinants of underpricing were proposed in their work. Our method differs from theirs in that we have incorporated pre-issue analyst presence in the underwriter's syndicate, which is a new variable, and assess its impact on IPO underpricing in the meta-analysis methodology. We make two contributions to the literature. First, regardless of whether the sample is US or non-US (developing market), this study is a first attempt to assess the effect size of analyst presence and its relationship with IPO underpricing.

Second, Daily et al., (2003) evaluated the impact sizes of several factors on underpricing and concluded that these effect sizes were effective. We take a step further by including meta-regression into our investigation of the effect magnitude of analyst presence on underpricing. We have added variables in the meta-regression, such as industry dummy and age of issuing business, the assets and share overhang of the issuing firm, the underwriter repute, and the country dummy for US and developing market data. The moderating variables are selected based on their proximity to the presence of analysts covering the business. For example, an associated analyst typically covers the company from whom they receive positive information (Lin and McNichols, 1998). Such businesses have reputed underwriters insuring them, are mature in terms of age, and have significant asset values. As a result, it is necessary to control these factors and determine their moderating influence in order to explain the magnitude of the relationship between analyst presence and IPO underpricing.

The meta-analysis results reveal that there is a substantial and positive link between pre-issue analyst presence and underpricing, which is around 4.9 percent. The presence of security analysts prior to the release of a product causes underpricing and contradicts the idea that security analysts contribute to informational efficiency. According to this idea, the presence of high-quality analysts covering the firm's IPO prior to the issuance increases informational efficiency. Increased information quality caused by pre-issue analyst presence should eventually minimize underpricing on the first day of the sale.

Our study, on the other hand, asks a very pertinent question: "Why does pre-issue analyst presence raise money left on the table for the issuing firm?" We addressed this topic by splitting the sample into US and emerging market data and determining the magnitude of the effect of analyst presence on underpricing on both data sets. The positive, significant, and larger-than-average effect size of the US sample, indicating increased underpricing owing to the presence of analysts in the underwriter's syndicate, demonstrates information asymmetry in the US IPO markets. This is due to the restrictions imposed by US authorities on preliminary research.

Furthermore, meta-regression results reveal that underwriter reputation has a positive and substantial impact on effect magnitude, implying that underwriting reputation moderates the effect of pre-issue analyst presence and enhances underpricing for the IPOs covered by the analyst. For the research utilizing US data, the results show that IPO underwriter reputation is significant in attracting pre-issue analyst presence, which further enhances skewed pricing of an IPO on the first day of the offering. The existence of a renowned underwriter as a mediator between analyst presence and emerging market data is important for emerging market data. Furthermore, underpricing the IPO has a negligible negative impact. The findings show that the presence of a renowned underwriter in a developing market IPO reduces information asymmetry and enhances market efficiency, which helps the issuing business by preventing money from being left on the table.

The following is the structure of this document. Section 2 discusses the primary literature on underpricing and pre-issue analyst presence. Section 3 demonstrates the study's data gathering and methodology. Section 4 displays the findings of the meta-analysis. Section 4 discusses the outcome. Section 5 brings the research to a close.

2. Review of literature

The discrepancy between the offer price and the first day closing price of the share when it is traded in the secondary market is the underpricing of the shares issued in the original offering. On average, Reilly and Hatfield (1969), McDonald and Fisher (1972), and Bear and Curley (1975) found that initial public offerings performed well on the first day. Ibbotson (1975) discovered that the positive return on the first day was 11.4 percent, indicating that the IPO was underpriced. With the assumption of information asymmetry, Baron (1982) presented a model to explain the underpricing of the IPO. He ascribed the underpricing to the issuer's failure to oversee the underwriter's distribution activities, which results in lower offer prices on a listing day, resulting in underpricing.

Underpricing or anomalous first-day returns have been investigated as a predictive variable in the literature following the listing of the IPO (Rajan and Servaes (1997), Aggarwal et al (2002), Cliff and Dennis (2004), Gwilym and Verousis (2009), Bourzoita et al (2015)). Aside from that, another set of studies exists in which IPO underpricing is extensively investigated as a result of factors, for example, offer price changes, pre-issue analyst presence, underwriter preferences (agency problem), reputation and characteristics, venture capitalist presence, lead-manager reputation, star analyst presence, company industry characteristics (Cliff and Dennis (2004), Arnold et al, (2010), Adjasi et al (2011), Alanazi and Al-Zoubi (2015), Bradley et al (2015), Chourou et al (2018), Fullbrunn et al (2019), Jia et al (2019), Boulton et al (2020),).

According to Chang et al. (2016), the cause for IPO underwriting is an agency problem between the underwriter and the issuer. They emphasized the underwriter's authority as a result of the book building technique, in which they have complete control over the price. By displaying control, underwriters achieve their aim of attracting the most attention from institutional and retail investors for the IPO. Their gain is a decrease in subscription risk and an increase in commission by allocating underpriced shares to institutions or their clients (Loughran and Ritter, 2002).

Furthermore, by partially adjusting the offer price, underwriters attempt to reconcile the issuer's expectation of maximum issue proceeds with their own aims, as stated above. Benveniste and Spindt (1989) provided an alternative perspective on balance. They argue that underwriters analyze the IPO's demand with the aid of information providers on a certain offer price and then modify the price partially upwards to pass on the advantage to the issuer and the difference in the form of underpricing to provide the information providers monetary profits. Thus, underwriters are IPO price makers, and through underpricing, they achieve a variety of objectives, one of which is analyst coverage post-IPO.

The presence of top analysts and respected lead managers in the venture capital company also contributes to underpricing. The underwriting syndicate idea was proposed by Bradley et al. (2015). They discussed the relationship between the lead manager, co-manager, and underwriter and emphasized the ease with which businesses supported by prominent venture capitalists may obtain analyst presence when underpricing is high. Furthermore, the firm's IPO is underpriced if it is backed by top venture capitalists, indicating underplay between the underwriter and its associates, as observed by Liu and Ritter (2010) as a spinning hypothesis, and is consistent with the hot IPO chase by the star analyst, as proposed by Loughran and Ritter (2004) and further examined by Cliff and Denis (2004) and Liu and Ritter (2011).

In addition to post-IPO analyst coverage, which is a consequence of underpricing as represented in the analyst lust theory, pre-issue analyst coverage is another predictor of IPO underpricing in the literature. Jia, Xie, and Zhang (2014) discovered, using data from Chinese IPOs from 2006 to 2012, that pre-IPO research and coverage increases the likelihood of offer price adjustments and positive sentiment. The study's most interesting finding was a negative relationship between offer price revisions and first-day returns, which Jia et al. (2014) attributed to pro-rata allocation rules different from those used in US IPOs, which prohibit underwriters from allocating underpriced shares to their associates, ensuring that pre-IPO analyst research is fully incorporated into the IPO price.

The link between offer price revisions and underpricing is paradoxical due to varied IPO guidelines in developing and developed financial markets. As a result, it is worth noting the relationship between the presence of analysts in the underwriter's syndicate (covering the business before or post-IPO) and underpricing in both US and developing market studies.

Investors and financial markets benefit from the analyst role in information sharing. This is what one section of the literature claims. Ivakovic and Jegadeesh (2004), for example, argue that the analyst discovers the private information and analyses the released information. As a result, analysts create a more favorable information environment in which private and public information flows effectively from the firm to the investors. Another body of work challenges the information efficiency theory in relation to analysts. For example, both affiliated and unaffiliated analysts provide pre-issue IPO research and IPO presence. The presence of affiliated analysts covering the firm's pre-issue IPO may be owing to the underwriter's need, and therefore in the literature, it is clear that this presence might offer investors skewed signals.

According to Michaely and Womack (1999), underwriter analysts (associated analysts) offer more skewed signals to investors than unaffiliated analysts. Concurrent with this discovery, Degeorge (2007) stated that issuers pay for the positive presence of linked and unaffiliated analysts, resulting in skewed signals. As a result, unaffiliated analysts may contribute to the information inefficiency that affects IPO price discovery and may result in underpricing. Hence, the literature contains evidence of biased recommendations from both affiliated and unaffiliated experts.

He and Lin (2015) provided evidence of a reduction in information asymmetry as well as an improvement in information precision to support the information efficiency theory connected to analyst following. According to Baron, IPO underpricing is an anomalous event caused by the uncertainty produced by information asymmetry (1982). Underpricing is likely to reduce as a result of the pre-issue analyst involvement in the IPO. Sahoo (2014) examined 157 IPOs in India from 2007 to 2012 and discovered a negative link between IPO underpricing and analyst pre-issue IPO presence.

Jia et al. (2019) discovered, with identical results, that analysts' pre-issue presence reduces early returns. Wang (2008) compared underpricing in three different nations. They discovered less underpricing in Hong Kong IPOs when compared to US and Singapore IPOs, and they ascribed the difference to the fact that pre-issue IPO research is permitted in Hong Kong but not in the other two countries. Furthermore, Deng and Dorfleitner (2008) discovered a negative link between numerous

co-lead managers covering the IPO and the IPO's first-day results. They claimed that increasing the presence of co-lead managers might reduce underpricing evidence by lowering the IPO's early returns.

Some evidence contradicts the unfavorable link between pre-IPO research and underpricing. According to Loughran and Ritter (2004) and Liu and Ritter (2011), the inclusion of star analysts and respected underwriters in the team causes the IPO to be underpriced. As a result of their findings, they provided the first proof of analyst lust theory, which explains the tendency of venture capital-backed businesses to have a thirst for star analyst coverage of an underpriced IPO. Kennedy et al. (2006) show that as the number of co-lead managers grows in IPOs, so does the underpricing. According to Loughran and Ritter (2004), co-lead managers are members of the underwriter's syndicate and offer research coverage for the IPO. As a result, their research coverage is biased toward the buy-side, creating upward momentum for the share price on the first day of trade, leading in IPO underpricing.

Jeon et al. (2015) discovered much decreased underpricing as a result of several underwriters handling the problem. They documented the idea in contrast to Hu and Ritter's (2007) tradeoff argument, which focuses on increasing the number of underwriters to enhance visibility at the expense of increasing underpricing. However, the amount of underpricing reported by them is proportional to the quantity of analysts covering the problem. Furthermore, Dambra et al. demonstrated an improvement in a firm's visibility at the expense of underpricing (2018). They contend that an increase in analyst pre-IPO presence enhances investor confidence, resulting in greater volume and price momentum post-IPO. Eventually, greater investor confidence leads to increased underpricing. Furthermore, Massa and Zhang (2020) demonstrated the favorable link between underpricing and the existence of a star analyst.

There is conflicting data about the relationship between pre-IPO analyst presence and underpricing. As a result, further research is required to answer the question: Is the presence of a pre-issue analyst significantly connected to underpricing? Is there a good or negative influence of pre-issue analyst presence on underpricing? Concurrent with these study questions, our research hypothesis is: "The existence of pre-issue analyst presence has an influence on underpricing." Furthermore, we contend that underpricing caused by pre-issue analyst involvement is mitigated by underwriter repute and the presence of venture capitalists, the assets and age of the firm, the industry characteristics, and the nation from where the data was taken. In anticipation of future advantages, the firm's underwriter reputation draws analyst presence (Loughran and Ritter, 2004).

3. Data and methodology

3.1 Selection of data

Cooper (1982) recommended descendency technique is used by us. In this method, all of the articles that are cited central to the issue are retrieved and then evaluated for relevancy to the main concept. This procedure is repeated until the search is completed.

We examined three databases for relevant studies: Science Direct, Scopus, and Clarivate. The term "underpricing" yielded almost 2000 items across all three databases. The papers were then shortlisted based on these criteria:

1. Underpricing, first day returns or beginning returns are retained as a dependent variable in the model, whereas pre-issue analyst presence is an independent variable or belongs to a control group of variables.
2. To eliminate the publishing bias proposed by Cooper, studies are chosen regardless of the importance of the influence of the independent variable on the dependent variable (1982).
3. To reduce variability in the sample of research, we included equity IPOs but omitted SEO and REIT.

3.2 Sample Size

After applying the criteria, we chose twelve papers that matched the goal of the meta-analysis. In all of the research, the sample period begins in the year 2000.

3.3 Methodology

In this work, we have utilized meta-analysis to determine the cumulative effect size of pre-issue analyst presence as an independent variable on the dependent variable, IPO underpricing. The analysis of the analysis is known as meta-analysis (Glass, 1970). It is a quantitative approach for determining the empirical aggregate effect of a predictor variable on a dependent variable based on the findings of many studies. Furthermore, unlike qualitative evaluations, the technique successfully captures heterogeneity (Light, 1984). The aggregate link between the two variables is evaluated using the variable's correlation coefficient and the sign of the correlation coefficient in this technique. The Fisher's z-transformation method is used to convert the correlation coefficient to its impact magnitude (Hedges and Olkin, 1985). Another approach for determining effect magnitude is to compute the weighted mean of correlation coefficients (Hunter and Schimdt, 1990).

In this study, we are interested in the beta coefficients and t-values of the regression model that relates IPO underpricing with pre-issue analyst presence in various studies. For instance, a regression model is:
Underpricing = $\beta_0 + \beta_1 \times$ pre-issue analyst presence + e

We use Doucouliagos (1995) to convert beta coefficients, such as 1, into partial regression coefficients. This technique offers an advantage over Hedges and Olkin's (1985) method of estimating effect magnitude using correlation coefficients. By converting the beta coefficients as partial regression coefficients, it is simple to compare beta coefficients at scale (PRC). Furthermore, PRC checks the misspecification bias in the model by investigating variations in estimating models and control variables (Hang et.al., 2018).

PRC is calculated with the t-value or p-value of the coefficient by this formula:

Partial correlation coefficient (PRC) = $\sqrt{\frac{(t-value)^2}{(t-value)^2+d}}$, Where d is the degrees of freedom and is equal to n-p-1 (n is a number of observations, p is the number of independent variables).
Additionally, we calculate standard error as:

Standard Error (s.e.) = $\sqrt{\frac{(1-PRC)^2}{d}}$

The calculation of the PRC or the effect size from all twelve trials allows for a comparison of the correlation between the two variables (underpricing and pre-issue analyst presence), as the correlation is determined while all other factors are held constant. After calculating the PRC or effect size for each of the twelve studies, we average them to produce the overall effect size, which we then estimate.

Using the random effect model, we estimate the combined effect size for twelve research. In meta-analysis, the random effect model corrects for sample size bias (or between-study variance) by providing weights that are adjusted for between-study variation in addition to within-study variation. As a result, all the weights assigned to the individual studies have been changed to account for any bias induced by differences in sample, in the fixed effect model; the research with the higher sample

size will be given more weight and will differ considerably from the other small sample studies (Borenstein et al., 2010). However, under the random effect model, the weights will now be lowered downwards by the between-study variance component to balance the large sample study's overall dominance.

The random effect model estimates random fluctuations in each research to compute its comparative weight in relation to the other studies, as illustrated below:

$$w = \frac{1}{(SE_{r_{YX_k}} + \hat{v})}$$

Where, $\hat{v}$ is the random variation in the twelve studies and $SE_{r_{YX_k}}$ is the standard error of the Fisher Z-score of the effect size ($Z_{r_{YX_k}}$) of the individual studies, as shown below:

$$SE_{r_{YX_k}} = \frac{1}{(n-3)}$$

These effect sizes are transformed to Fisher-transformed z-score Standard error which calculated by this formula:

$$Z_{r_{YX_k}} = \frac{1}{2}\ln\left(\frac{1+r_{YX_k}}{1-r_{YX_k}}\right)$$

Table 1: Summary of Variables as Covariates in the Meta-regression

Variable	Working definition	Type	References
Industry	Industry dummy is used in the studies to control for the industry effects.	Binary: 1 if study controls for this variable, 0 otherwise	How and Low (1993)
Year	Year dummy is used in the studies to control for the year effects.	Binary: 1 if study controls for this variable, 0 otherwise	Tomzyck (1996)
Age	Age dummy is used in the studies to control for the age of the firm.	Binary: 1 if study controls for this variable, 0 otherwise	Jaitly (2004)
Underwriter's Reputation	Underwriter reputation dummy is used in the studies to control for the reputation effects.	Binary: 1 if study controls for this variable, 0 otherwise	Carter and Manaster (1990)
Assets	Asset dummy is used in the studies to control for the effects raised by assets of IPO firms.	Binary: 1 if study controls for this variable, 0 otherwise	Loughran and Ritter (2004)
Overhang	Overhang dummy is used in the studies to control for the effect created by ownership of the shares post-IPO by the owners (If they choose not to sell their stake on the listing day).	Binary: 1 if study controls for this variable, 0 otherwise	Bradley and Jordan (2002)
Venture Capitalist (VC)	VC dummy is used in the studies to control for the VC effects.	Binary: 1 if study controls for this variable, 0 otherwise	Barry et. al., (1990)
Country	Country dummy is used in the studies to control for the effects raised by US or the emerging market studies.	Binary: 1 if study controls for this variable, 0 otherwise	Chowdhry and Sherman (1996)

Note: This table contains a summary of the covariates used in the meta regression. The variables are all binary. Their citations are also provided in order to identify these variables from the current theory.

The factors mentioned in Table 1 are used as control variables in the meta-regression, and the average effect size is used as the dependent variable. The link between underpricing and pre-issue analyst presence is influenced by the control factors. As a result, it is recommended to do meta-regression using these control variables to identify the real influence of underlying research variables. Underwriter reputation, for example, is a control variable that influences underpricing on the listing day. As a result, we account for this variable to see if it has a moderating influence on the link between pre-issue analyst presence and underpricing.

Similarly, we account for factors such as industry, year, age, asset, overhang, and nation. As a control variable in the research under consideration, these variables are assigned the categorical values "0" for absence and "1" for presence (Klona, 2021). This is owing to a lack of continuous data for these variables in these twelve studies. For example, in most studies, the asset is indicated as a control variable, but its value is not clearly stated in the study articles. Similarly, overhang is assigned a value of "1" in meta regression as a covariate indicating the controlling impact of this variable in the twelve research, we selected for meta-analysis to determine whether it may alter pre-issue analyst presence to minimize underpricing.

4. Results and Discussion

4.1 Meta-analysis

Using a random effect model using data from 12 studies and 12 effect sizes and a total of close to 20,400 observations, the overall effect size is 4.9 percent and significant with a p-value of 0.017 (Table-2). The study's between-study variation is high, showing that factors have a moderating effect on the link between pre-issue analyst presence and underpricing. The heterogeneity test, which yields a Q-value of 95.437, further supports the moderating impact on the underpricing and analyst presence connection. This number indicates that the homogeneity null hypothesis is rejected. Furthermore, the p-value for the chi-squared test for homogeneity is 0.000, and the I-squared value is 88.5 percent (Table-2) suggesting heterogeneity, indicating that 88.5 percent of the observed variance in the studies is attributable to the variables in the studies.

Table 2: The Meta-Analysis Displaying the Impact Size Data for Twelve Individual Studies

Study name	Sample size	Effect size	t-value	weight%
Cliff (2004)	1050	0.07*	2.18	8.70
Kennedy (2006)	2381	0.06**	2.75	9.81
Deng (2008)	194	0.15**	1.96	4.27
Wang (2008)	1168	0.05	1.728	8.85
Liu (2011)	4510	0.04**	2.63	10.28
Jia (2014)	1093	0.03**	2.6	10.46
Sahoo (2014)	157	0.19**	2.306	3.88
Bradley (2015)	4180	0.05***	3.292	10.26
Jeon (2015)	631	0.02	0.494	8.06
Dambra (2018)	363	0.14**	3.07	7.12
Massa(2020)	3949	0.05**	3.05	10.21
Ma (2020)	781	0.32***	9.4	8.11
I-V pooled ES		0.049**	2.39	100.00
Heterogeneity Chi-squared = 95.47 (df=11, p-value= 0) I-squared = 88.5% (variations due to heterogeneity)				

Note: This table shows the effect size data of all the twelve studies. The symbols *, **, and *** in the table denote significance levels of 10%, 5%, and 1%, respectively.

As the data demonstrate, pre-issue analyst presence enhances underpricing of IPOs. This conclusion is consistent with Deng and Dorfleitner's (2008) and He and Lin's (2015) findings, which support the concept of greater first-day returns due to analysts' pre-issue presence. The cause for this outcome might be attributed to the issue's co-biased manager's recommendation to the purchase side, or to the analysts present in the underwriter's syndicate (Loughran and Ritter, 2004). This skewed information produces information asymmetry, which results in greater early returns for the share due to its larger demand bias.

Figure 1 illustrates the contribution of each research to the overall conclusion using a forest plot. The size of the sample is shown by the black vertical line in the forest plot for each research, and the confidence interval is indicated by the horizontal line. The vertical line at the bottom of the picture depicts the overall effect size and its importance since it intersects the interval's midpoint. This discovery is connected to the considerable influence of analyst presence before to issuance on underpricing. The total confidence interval of the effect magnitude is shown by the length horizontal line.

Figure1: Forest Plot

Model	Study name	Statistics for each study					Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	-0.50 -0.25 0.00 0.25 0.50
	Jia (2014)	0.032	0.008	0.056	2.599	0.009	
	Liu (2011)	0.039	0.010	0.068	2.629	0.009	
	Sahoo	-0.187	-0.338	-0.027	-2.285	0.022	
	Ma (2020)	0.320	0.256	0.382	9.223	0.000	
	Wang	-0.051	-0.108	0.007	-1.726	0.084	
	Bradley	0.050	0.020	0.080	3.290	0.001	
	Massa(2020	0.048	0.017	0.079	3.048	0.002	
	Kennedy	0.056	0.016	0.096	2.748	0.006	
	Deng	-0.148	-0.291	0.001	-1.947	0.052	
	Jeon (2015)	0.018	-0.053	0.089	0.494	0.622	
	Dambra	0.136	0.049	0.221	3.057	0.002	
	Cliff (2004)	0.067	0.007	0.127	2.177	0.029	
Random		0.049	0.009	0.088	2.395	0.017	

Note: This figure depicts the contribution of each study to the calculation of the cumulative effect size. Horizontal line shows the confidence interval and vertical small line shows effect size of the study.

The vertical line at the bottom of the picture depicts the overall effect size and its importance since it intersects the interval's midpoint. This discovery is connected to the considerable influence of analyst presence before to issuance on underpricing. The total confidence interval of the effect magnitude is shown by the length horizontal line. The total impact size of analyst presence on underpricing is positive and significant in the US sample of research, at 1%.

Table-3 shows that the effect magnitude is given as 5%. The impact size in the developing market sample is smaller, at 1.3 percent, and negligible (see Table-4). This conclusion is intriguing, and one of the explanations might be the homogeneity of the US study population. The reported I-squared for US studies is low (0.04%, Table-3), indicating that the observed variance in US studies is not related to between-study variation. The observed variance in emerging market research, however, is due to between-study variation, since I-squared is 97.59 percent, showing significant heterogeneity in emerging market studies. This explains the insignificance of the impact size in developing market research

Table 3: Meta-Analysis Results Showing the Effect Size Data for Six US IPO Studies

Study name	Sample size	Effect size	t-value	weight%
Liu (2011)	4510	0.039**	2.63	33.35
Bradley (2015)	4180	0.05***	3.292	31.83
Kennedy (2006)	2381	0.056**	2.75	17.72
Jeon (2015)	631	0.018	0.494	5.52
Dambra (2018)	363	0.136***	3.07	3.80
Cliff (2004)	1050	0.067	2.18	7.79
I-V pooled ES		0.050***		100.00
I-squared = 0.04%				

Note: This table shows the effect size data of six non-US studies. The symbols *, **, and *** in the table denote significance levels of 10%, 5%, and 1%, respectively.

Table 4: Meta-Analysis Results Showing the Effect Size Data for Six US IPO Studies

Study name	Sample size	Effect size	t-value	weight%
Jia (2014)	1093	0.032	2.6	18.02
Sahoo (2014)	157	-0.187	2.306	14.38
Ma (2020)	781	0.320	9.4	17.39
Wang (2008)	1168	-0.050	1.728	17.51
Massa(2020)	3949	0.048	3.05	17.95
Deng (2008)	194	-0.148	1.96	14.75
I-V pooled ES		0.013***		100.00
I-squared = 0.04%				

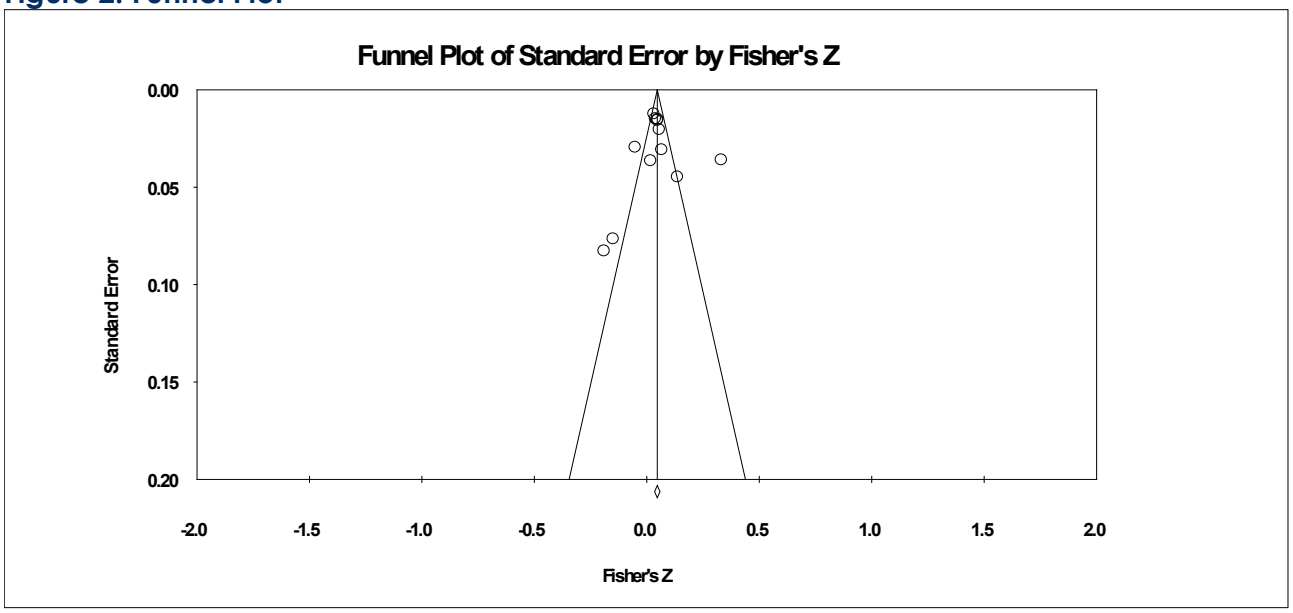
Note: Table shows the effect size data of six US studies. The symbols *, **, and *** in the table denote significance levels of 10%, 5%, and 1%, respectively.

The disparity in outcomes between US and developing market research can be ascribed to below mentioned factor. The developed markets, for example, have established companies with a defined capital structure. As a result, the underwriter or book manager may properly evaluate the issuing business and establish the offer price to attract the appropriate attention from stock analysts and prospective investors following the IPO.

In contrast, in emerging market firms, the capital structure is less effective and the determinants of it are not precisely known, making them slightly riskier to value (Eldomiaty, 2008), making it difficult for the underwriter or book manager to estimate the intrinsic value of the firm's IPO and thus the offer price. In this instance, high-risk businesses may engage reputed underwriters, resulting in a larger pre-issue analyst presence, which decreases underpricing (Bowen et al, 2008).

Figure 2 depicts a funnel plot used to determine the presence of publication bias in a meta-analysis. This figure identifies the bias in the meta-analysis caused by unpublished studies with negligible p-values (Harbord et al, 2006). The standard error is represented on the y axis of the funnel plot in Figure-2, and the effect size estimate is shown on the x axis of each study. The figure clearly shows that the studies with the highest weight converge to the pooled estimate, which is at the top of the curve. Nonetheless, three investigations are located outside the plot's left boundary. They are, nevertheless, far closer to the confidence limits. One research is outside the funnel plot's right bounds and also farther away from it. This demonstrates the presence of publication bias in these four papers, and we used the small study bias test to validate it.

Figure 2: Funnel Plot



Note: This is a plot of standard error vs Fisher's z-score. Studies that are outside of the left and right margins add to the publication bias.

The small study bias test illustrates the variation in findings between small and big studies owing to differences in research quality. Egger's test (Egger et al., 1997) was employed for this (see Table-5). The null hypothesis states that no small study bias exists. The two-tailed p-value is 0.96, and we are unable to reject the null hypothesis, indicating that this study is free of small study bias. As a result, despite the evidence of publication bias in four studies in our study, Egger's test revealed that the divergence of four studies from the confidence limits is attributable to other reasons.

Table 5: Egger's Test for the Identification of Small Study Bias

Intercept	0.07805
standard error	1.884
t-value	0.04
degree of freedom	10
p-value	0.96

4.2 Meta-regression

Meta-regression is carried out with study-specific characteristics serving as control variables (see Table-1) and the cumulative effect size of twelve studies serving as the dependent variable. We computed the Hausman's test in all three models, model-1, model-2, and model-3, to check for any confounding effect or enodogeneity in the regression model (see Table-6).

Table-6 Meta regression results for three models

To estimate the coefficients in the Meta regression, the random effect (RE) model is employed. Meta regression is carried out with the dependent variable being effect size and the independent variables being study level characteristics. All the explanatory variables in the research are binary, with values 1 and 0 indicating their existence or absence. The symbols *, **, and *** in the table denote significance levels of 10%, 5%, and 1%, respectively.

Variable	Model-1	Model-2	Model-3
Intercept	-0.25***	-0.23**	-0.24**
Industry	-0.19*	-0.21*	-0.21*
Year	0.3***	0.29***	0.29***
Age	0.14*	0.12	0.12
Underwriter reputation	0.12**	0.13**	0.12**
Asset		0.03	0.02
Overhang	0.11	0.09	0.1
VC			0.02
Country	0.09	0.08	0.09
N	**12**	**12**	**12**
Hausman's test p-value	**0.59**	**0.68**	**0.77**
Model	**RE**	**RE**	**RE**
Adj R^2	**0.64**	**0.65**	**0.66**
Model validity	**Yes, at p-value= 0.02**	**Yes, at p-value=0.03**	**Yes, at p-value=0.04**
Goodness of fit	**Yes, at p-value= 0.000**	**Yes, at p-value=0.000**	**Yes, at p-value=0.000**

We test the null hypothesis that there is no systematic difference between the Fixed and Random effect model coefficients. We fail to reject the null hypothesis since the estimated p-value is 0.59 for model-1, 0.68 for model-2 and 0.77 for model-3. This demonstrates the lack of endogeneity in the three models we estimate. As a result, we employ the random effects model to estimate the coefficients in the three models.

Table-6 shows the estimates of the coefficients by applying the random effects model. Year, industry, and underwriter repute are all significant variables in all the model specifications, i.e., model-1, model-2, and model-3. When all variables, except asset and VC, are included in the model, the underwriter's reputation is significant at the 5% level of significance.

The industry and year fixed effects covariate are both significant. As a result, the industry and year variables in the research are sources of heterogeneity and moderate the relationship between pre-issue analyst presence and IPO underpricing. The negative sign of the coefficient of the industry variable indicates that when the research study controls for industry fixed effects, the impact of analysts' presence prior to the IPO on underpricing is reduced. The reduction in effect size as a result of industry effect as a control variable demonstrates that it can lead to improved efficiency in information transmission since it adjusts for price clustering in the given industry (Cao and Shi, 2006) and therefore lowers underpricing.

In research that adjusts for years fixed effects in the regression model, the effect magnitude is greater. Underpricing is a transient phenomenon that is highly dependent on market conditions. Increased effect size in research controlling for year fixed effects shows that in a short period of time, ignoring external economic fixed effects, pre-issue analyst coverage has the tendency to distort the pricing of the IPO. Significance of underwriter reputation, with a p-value of 0.0396 and a positive effect size of 0.12, demonstrates that underwriter reputation increases the influence of pre-issue analyst presence on IPO underpricing. These findings are consistent with those of Beatty and Welch (1996) and Loughran and Ritter (2004), who showed a positive correlation between underwriter reputation and IPO underpricing. To comprehend the beneficial impact of underwriter reputation on effect size, we must first appreciate the link between underwriter reputation and IPO analysts.

Reputable underwriters attract analysts to follow the firm's IPO, and analysts begin making recommendations prior to the IPO listing day; the observation that the underwriter's reputation has a beneficial influence on the effect size shows the issue's enthusiasm among investors. This generates excitement for the IPO among investors, who are drawn to the issue in order to raise its subscription. On the day of the listing, pay-off to the initial investors in the business is consistent to the spinning

hypothesis (Loughran and Ritter, 2004). Furthermore, the issuer's willingness to leave money on the table is related to confirming long-term investor relationships as well as success in attracting uninformed investors (Beatty, 1986).

6. Conclusion

The meta-analysis of the twelve studies has assisted in identifying the aggregate effect of pre-issue analyst presence and its role in IPO underpricing. The link between them is ambiguous in the literature. The meta-analysis reveals that the total effect size of the twelve studies is substantial and favourable. The extent of the favourable effect implies that IPO underpricing has increased as a result of pre-IPO analyst presence. As a result, rather than creating a more efficient information environment for investors, the presence of analysts prior to the IPO causes an information gap, resulting in over-hyping of the issue and higher initial returns on the first day of issue. This finding is also consistent with the spinning hypothesis, which promotes underpricing as a method of rewarding venture capitalists or other early investors and advocates for the inclusion of reputable underwriters in the IPO process.

Furthermore, statistics from US IPOs suggest that analyst presence has a significant impact on IPO underpricing. Due to the variability in their research, the impact size of the connection between analyst presence covering the business and underpricing in emerging market's IPOs is smaller but not negligible. The homogeneity of research in the United States and the heterogeneity of the developing market sample is attributed to this result. The reason for the disparity in their conclusions is due to differences between researchers, which may be related to the difficulty that IPO analysts or issue underwriters may have while valuing the business. As a result of their varying levels of capital market maturity, emerging market businesses exhibit heterogeneity in their outcomes. As a result, this study is effective in isolating the influence of nation as a covariate.

Moreover, the reputation of the underwriters amplifies the effect of analyst presence on IPO underpricing. The underwriter's reputation has an overall favourable and substantial influence on the link between analyst coverage and IPO underpricing, according to the moderation analysis of the variables on effect size. As a consequence, reputable underwriters have demonstrated the impact of analysts' presence prior to the underpricing of the IPO. As a result, the finding validates the information asymmetry theory for the issuing business, which depicts the IPO underpricing as a result of price manipulation by the underwriter and its syndicate, which includes analysts. More research is needed to understand the factors that contribute to the link between pre-issue analyst presence and underpricing.

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