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A Performance based Ranking of Initial Public Offerings (IPOs) in India

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Abstract

In recent times, Indian Stock Market (ISM) has been witnessing a surge in the number of IPOs listed in stock exchanges. However, in many occasions it has been noticed that post-listing performance of several IPOs are below par to the expectations of the investors. IPO performance has been one of the major concerns. In this context, the present paper endeavours to carry out a comparative performance assessment of a list of IPOs. We consider a period of three years after listing. Our sample consists of a list of IPOs having heterogeneous nature of business operations and introduced in 2018. We consider two aspects of the performance such as market-based indicators and fundamental efficiency in terms of profitability, liquidity and risk. For comparison, LOgarithmic Percentage Change-driven Objective Weighting (LOPCOW) is used. The study period is considered as Fy 2020-21. The results reflect that for IPOs, market performance does not necessarily because of the fundamental efficiency. Further, we notice that the nature of equity ownership does not influence the market performance significantly. We surmise that during initial years, the performance of the IPOs at the marketplace is more driven by speculations and short-term goals of the investors. The result of validation test indicates that the ranking using LOPCOW method is comparable and consistent with a widely used model like Entropy.

Keywords: Initial Public Offering (IPO), Market Performance, Fundamental Financial Ratios, Multi-Criteria Decision Making (MCDM), LOgarithmic Percentage Change-driven Objective Weighting (LOPCOW) Method

1. Introduction

The present paper seeks to compare the performance of a set of IPOs listed in BSE, India in 2018 after three years of their listing using market based and fundamental financial indicators. The Indian Capital Market is witnessing a massive surge in IPOs (Initial Public Offering) for the past few years. This has not only made IPO a lucrative avenue for investment but has also made as a significant topic for corporate as well as academic research. As defined in the literature by Securities & Exchange Board of India (SEBI Report), an IPO is defined as “When an unlisted company makes either a fresh issue of shares or convertible securities or offers its existing shares or convertible securities for sale or both for the first time to the public, it is called an IPO” (SEBI Report). Putting into simple terms, IPO refers to the process by which a privately held company offers its share for the first time to the general public.

There are many schools of thought behind the reasons that why a firm release IPOs such as life-cycle theory, market timing theory and so on. A company initiates the public offering of shares when it wants to infuse fresh capital for its future operation like expansion, diversification, or modernization. Furthermore, the owner wants to enhance the value of the firm by issuing IPOs under favourable market conditions which otherwise is not possible through straightforward sale (Ritter and Welch, 2002). From the perspective of the stock market, IPOs open the door to include new investors, provide new investment options and aid the financial inclusion initiatives (Baltakienė et al., 2019). The IPO investments are made strategically to acquire the stocks of a company or are purely for investment purpose-made after risk and return trade-off. In both cases, the investors need to be aware of the past as well as the future financial performance of the company.

The IPO investment has gained substantial momentum in the past few years where the whooping sum of INR 1.2 lakh crore was raised by the companies in the year 2021 itself. The previous studies also show that with the increase in attractiveness of IPO investment, the participation of Retail Investors has grown exponentially in the capital market. It is also seen that the retail investors subscribing to the maiden offering have tripled in the post-pandemic world. Numerically speaking, National Stock Exchange (NSE) alone has seen growth in the share of retail investors from 33% in 2016 to 45% in 2021 (The Economic Times, 2021; EY Report, 2021).

However, uncertainty being one of the characteristics of the stock market invests a risky affair as the stock performance or gain/loss cannot be exactly predicted in advance. Post-issue, in several occasions IPOs do not rise on the occasion and their operating performance get declined. The extant literature noted various concerns such as agency cost, amplified intrinsic value of the firms, selection of favourable market timing by the entrepreneurs among others (Jain and Kini, 1994). Therefore, before making an IPO investment, it is imperative for an investor to stud the fundamentals or the past financial statements of the company along with its prospectus stating the prospects of the company, to make an informed decision about the investment. As stated and studied the performance of the stock in the future cannot be predetermined but there is a general belief that the company's overall performance along with its stock performance gets better post IPO. But the recent series of IPO are witnessing losses, making the post-IPO performance a major concern for the investors, especially retail investors.

In this context, the premise of the paper is to determine the present performance of the companies listed in the year 2018. A comparative study of the market performance along with an examination of whether the market positioning of the IPOs gets reflected in their fundamental financial performance in terms of profitability, liquidity, and risk is investigated in the study. The present paper seeks to address the following research questions:

- How do the IPOs differ in performance subject to market based and fundamental indicators?
- Does market performance get reflected in the financial performance?

To answer the above-mentioned research questions, we compare the IPOs separately on the basis of market and financial performance using multiple indicative ratios. Since, multiple indicators are involved to compare the IPOs, the present problem is an example of multi-criteria decision-making (MCDM). MCDM models help the decision-makers (DM) to evaluate a set of available options while satisfying the desired effects of a number of objectives or criteria which are conflicting to each other (Gupta et al., 2019a). MCDM methods are found to be useful in solving various complex problems in the real-life (for instance, Karmakar et al., 2018; Laha and Biswas, 2019; Biswas et al., 2019; Biswas, 2020). In this paper, we use a newly developed algorithm such as LOgarithmic Percentage Change-driven Objective Weighting (LOPCOW) that determines the criteria weights using objective information (Ecer and Pamucar, 2022). Over the years, several researchers have been utilizing MCDM algorithms based on objective information (for example, Gupta et al., 2019b; Pramanik et al., 2021; Biswas et al., 2022f) to avoid subjective bias contributed by human opinions and to capture true characteristics of the data. Among the available MCDM algorithms using objective information, Entropy method (Shannon, 1948) has been widely used in past research. However, the newly introduced LOPCOW method provides the following advantages:

- Ability to deal with large sized data with substantial variations

- Unlike the Entropy method, LOPCOW allows a considerably uniform distribution of criteria weights
- Ability to use negative values for deriving the criteria weights. The presence of negative value in the dataset is quite common in real-life situations. For instance, stock returns are often found to be negative. Therefore, for our problem, LOPCOW provides a unique advantage.
- Ability to handle a large criteria set.

Due to its benefits, LOPCOW has garnered an increasing use in solving practical problems related to engineering, social science, management and technological issues (for example, Biswas et al., 2022a, 2022b, 2022c, 2022d, 2022e; Badi et al., 2022). In the present problem, we use LOPCOW not only for obtaining the criteria weights but also for ranking of the IPOs. However, we also utilize the Entropy method for ranking purpose to validate the results obtained by using LOPCOW.

The remaining part of this paper is presented as follows. In section 2, a brief review of some recent literature is given. Section 3 describes the data and research methodology. The results are provided in section 4. Necessary discussions on the results are made in section 5. Finally, section 6 concludes the paper and provides some future directions.

2. Related Work

In this section, we present the summary of some of the recently published related work on IPO performance. For instance, Mayur and Mittal (2014), explored the relationship between the deteriorating post-IPO operational performance of the firm and the under-pricing of the companies that went public from the year 2000-2010. They categorized the selected sample into-low under-pricing and high under-pricing firms. The study showed that the deteriorating post-IPO performance is not related to either of the categories of under-pricing. In the work of Kuria (2014) a comparative analysis of the pre-issue financial performance and the post-IPO performance of 6 Kenyan companies have been done. The findings demonstrated that in the early days following their first public offerings, few companies performed better than others. However, when performance was tracked for a few years following their IPO, all of the companies displayed a drop in their financial performance. Pastusiak et al. (2016), made a comparison of the financial performance of private and publicly traded Polish companies and analyzed whether public offerings improve the firm's financial performance. It was concluded that the privately held companies in Poland were performing better than the ones that are traded on the Warsaw Stock Exchange. Singh et al. (2018) studied the post-offering performance of the IPO of BFSI during the period 2012-2016. The analysis revealed that BFSI witnessed a positive impact on its financials in the initial years of going public, which is quite opposite to the literature which majorly suggests the underperformance of the firms post listing. The authors suggested that the positive trend could be because of the increasing demand for services of BSFI post digitalization. Yalcin and Ünlü (2018) extended the strand of literature by comparing pre and post-listing performance of IPOs using an integrated measurement framework of accounting-based, value-based and overall measures while utilizing a combined VIKOR-CRITIC approach. Huang et al. (2019), studied how IPO performance post listing depends on the stability and development of the financial market because of a better long-term positive outlook and lesser asymmetry of information. In this context, Kamaludin and Zakaria (2019) conducted a study on Sharia-Compliant IPOs on a short term and long term basis using market adjusted returns and abnormal return. The study observed that IPOs outperform the benchmark indices (equal weight and value weight) on a long run.

In a recent work, Kongkaew et al. (2021) focused on establishing the importance of the founder's role as moderator for the relationship between internationalization and IPO performance. They worked on 80 international firms listed from the period 2013 to 2020 on Thailand Stock Market. The study concluded that internationalization does not directly influence the under-pricing of IPO. However, it was seen that the non-founder CEO position and role have a significant moderate effect. Mazumder and Saha (2021), investigated the impact of the market turmoil due to Covid-19 on the short-term performance of IPO and interesting observation

was reported. The result of IPO performance increased in 2020 concerning the past & eventually got decreased due to prolonged lockdown. Mumtaz and Yoshino (2021) put forth a different perspective on sustainability. The authors defined the greenness index and observed better performance of financial sectors. The study contended that greenness helps firms (IPOs) to achieve better long-term performance. In Che-Yahya and Matsuura (2021), the author delimited a positive impact of investor sentiment on the performance of IPOs in Japan in terms of return and traded volumes in the initial days. Kumar and Sahoo (2021), examined the post IPO pricing performance of the firms over a long period (36 months from the date of listing) in the regime of Anchor Investors. The study uses multiple regression to understand and analyze the long-term performance of IPOs backed by anchor investors as well as the ones with no anchor investors. The result concludes that Indian IPOs underperform in the long run in the anchor investor regime as well but the level of underperformance is significantly lesser than the IPOs not backed by anchor investment. Babu and Dsouza (2021), analyzed the short-term performance of the 52 IPOs listed in NSE from the year 2018 to 2020. The study was made to determine the listing gain or loss of the companies and the effect of other factors that might impact the post-IPO performance was also considered. The average IPO return was highest after three trading from the date of listing and other factors like- issue price, profit after tax, market return does not influence the IPO returns like oversubscription. Kumar et al. (2021), evaluated the impact of financial indicators like Debt to Equity, ROE, PE, and Projected Market Cap on the listing gain/loss of 54 companies that went public between 2018 and 2020. It was found that selected financial variables have no significant impact on the level of pricing during the listing. Rudianto (2021) examined the difference in the financial performance of selected IPOs listed in IDX before and after listing during 2014-2016. The author considered profitability, turnover, liquidity and leverage as performance measures and applied non-parametric tests like paired t-test and Wilcoxon signed rank test.

2.1. Research Gap and Contributions of the Paper

Determining the financial position of the companies after their IPOs is a key topic of the literature now in print. However, our best possible search reveals a scantiness of the research in Indian context that carry out a comparative analysis of IPOs given a stabilizing period. In the literature it is evident that the researchers (e.g., Kooli and Suret, 2004; Ahmad-Zaluki et al., 2007; Lizińska and Czapiewski, 2018; AlShiab, 2018; Kamaludin and Zakaria, 2019) have attempted to conduct a post-issue long-term performance of the IPOs. However, the studies are limited to market performance only using return and risk parameters. The present study takes the strand of literature forward by carrying out a three-year post-issue comparative performance assessment of Indian IPOs based on multiple indicators consisting of market return, risk, investors' sentiments, profitability, liquidity and leverage from two perspectives: Market and fundamental financial performance (i.e., Accounting based). In this sense, the current work fulfils the gap in the literature that invokes the need for considering both financial and stock market aspects to assess IPO performance (Mehmood et al., 2023). Hence, in what follows are the contributions of the present paper

- An integrated performance (considering both market based and fundamental financial indicators) based ranking framework for comparing IPOs in Indian context is presented. The framework considers market return and risk, earning prospects of shares, investors' perception about the stock, profitability, liquidity and business risk for providing a holistic measurement of performances of IPOs.
- The recent IPOs have shown some very high valuations at the time of issue but the immediate post-IPO performance has been disappointing. Therefore, unlike the extant literature, the present paper has assessed performances of the IPOs after a stabilization period of three years.
- Our best possible search reveals that application of MCDM approach for comparing IPO performance using both accounting and market based indicators is not plentiful. To our best understanding, the current study is one of its kind in the growing strand of literature.

- Extension of the application of newly born LOPCOW method for solving a real-life investment decision-making problem. The current paper utilizes the LOPCOW method for determining weights of the criteria and ranking of alternatives.

3. Data and Methodology

The present paper provides a multi-criteria based evaluation of the performance of a list of IPOs using market based indicators and a set of fundamental ratios. The objective is to provide a two-way objective measurement of performance.

3.1. Sample

In this paper we consider the IPOs listed in BSE in 2018. Thereby, we allow a considerable stabilization period of 3 years to the IPOs in the market place. The IPOs that are compared in the present paper are given in table 1.

Table 1. List of IPOs

Company Name	Code	Company Name	Code
Aavas Financiers Ltd	A1	H G Infra Engg. Ltd.	A10
Amber Enterprises India Ltd	A2	Hindustan Aeronautics Ltd.	A11
Apollo Micro Systems Ltd.	A3	I C I C I Securities Ltd	A12
Aster D M Healthcare Ltd.	A4	Indostar Capital Finance Ltd.	A13
Bandhan Bank Ltd.	A5	Mishra Dhatu Nigam Ltd.	A14
Bharat Dynamics Ltd.	A6	Newgen Software Technologies Ltd.	A15
Creditaccess Grameen Ltd.	A7	Rites Ltd.	A16
Fine Organic Inds. Ltd.	A8	T C N S Clothing Co. Ltd.	A17
Galaxy Surfactants Ltd	A9		

3.2. Performance Indicators

For the market-based performance comparison, we consider the following aspects

- What is the gain of the corresponding IPO in terms of the closing price at current state with respect to the initial listing value? (Indicator: Current Gain)
- What is the level of earning of the shares of the IPOs (Indicator: Earning Per Share or EPS)
- How market is perceiving about the prospect of the IPOs (Indicator: Price to Book value or P/B ratio)
- To what extent the IPOs under consideration have captured the market? (Indicator: Market Capitalization)
- What is the current state value of the IPOs? (Indicator: Enterprise Value)
- To what extent the concerned IPOs are subject to systematic risk as imposed by the external market? (Indicator: Beta)

The extant literature (For example, Islam et al., 2014; Bustani et al., 2021) have observed that EPS is one of the critical indicators that influence the share price movement and value of the firms. Since, IPOs are expected to show a favourable price movements after inception to attract more investments and thereby to stabilize, EPS is considered as an important indicator. Yin (2020) observed that P/B ratio is a significant indicator that reflects the sentiment of the investors for value investment. In this context, the market capitalization value is a portent of the future prospect of a firm in terms of its growth and size and therefore, helps the investors in portfolio selection and optimization (Kumar and Kumara, 2021). Enterprise value (EV) has bearings on the market value (MV) of the company. A higher EV leads to a higher MV that essentially adds incremental effect on shareholders' value (Dang et al., 2019). EV is a more generalized measure than the market capitalization. The performance of every stock at

the market place is subject to systematic risk. Risk disclosure and assessment plays an important role in the context of IPO performance (Wasiuzzaman et al., 2018). Beta value represents the risk factor in the present paper. The indicators used for the comparative assessment of the market performance (C1) of the listed IPOs are given in the table 2.

Table 2. List of market performance indicators

Criteria	Code	Description	Effect	UOM
Current Gain	C11	(Current Market Price – Closing Listing Price)/ Closing Listing Price	Maximize	Times
EPS	C12	Earnings after Tax/ Number of Shares Outstanding	Maximize	Rs.
P/B	C13	Market value per share/ Book value per share	Maximize	Times
Market Capitalization	C14	Total value of all shares of the company	Maximize	Rs
Enterprise Value	C15	Company's total value	Maximize	
Beta	C16	Covariance (Stock return & Benchmark Return)/ Variance (Benchmark Return)	Minimize	Value

On the other hand, for assessing the fundamental performance of the IPOs, we consider the dimensions like profitability (Indicators: Return on net worth or RONW, Return on total assets or ROA and Return on capital employed or ROCE), liquidity (Indicator: Debt Service Coverage Ratio or DSCR) and risk (Indicator: Leverage). Profitability indicators represent the efficiency of the management of the firm to generate surplus through its business operations by using available resources. Profitability is the top most concerns for the prospective investors followed by credit risk (consisting of liquidity, solvency, capital structure) (Alswalmeh et al., 2021). Among the profitability indicators, RONW, ROA and ROCE are some of the widely used measurement ratios. ROA reflects the sustainable financial performance of the firms (Lassala et al., 2017). RONW is an indication of company's capability to generate profit using the shareholders' capital. Higher is the value of RONW, more favourable is the sentiment of the investors which gets reflected in an increase in the investment and stock prices (Hertina and Saudi, 2019). Murtala et al. (2018) noted an inverse relationship between ROCE and Debt to Equity (DE) ratio. Therefore, the selection of ROCE in this paper is quite justified.

Liquidity is concerned with firm's ability to meet the short term obligations, mostly cash liabilities (Alswalmeh et al., 2021) in comparison with company's standings for fulfilling long-term debts in case of distressful situations. Since, in this paper we have considered the IPOs which got listed in 2018 (i.e., around 4 years of existence), we prefer to use liquidity measures other than solvency. In this regard, in this paper, we have considered DSCR as for fresh IPOs it is more relevant to understand company's cash flow to meet current debt obligations. DSCR helps in measuring the efficiency in generating operating income for paying the interest and annual debt (Kalemli-Özcan et al., 2018). Hence, during the initial years, DSCR is more appropriate to consider as compared with debt to asset ratio. The fundamental indicators (C2) for measuring performance of IPOs are discussed in table 3.

Table 3. List of fundamental performance indicators

Criteria	Code	Description	Effect	UOM
Return on net worth	C21	Annual Net worth of the company/ shareholders equity capital	Maximize	%
Return on total assets	C22	Net Income/ Total Assets	Maximize	%
Return on capital employed	C23	EBIT/ Capital Employed	Maximize	%
DSCR	C24	Net Operating Income/ Debt Service	Maximize	Times
Leverage	C25	Debt/PBDITA	Minimize	Value

3.3. Data Description

The decision-matrix (DM) for comparing market performances of the IPOs is given in table 4 while table 5 provides the performance values of the stocks under consideration with respect to fundamental indicators. The data have been collected from BSE website, CMIE Prowess and Moneycontrol.com databases. In the table 6, the ownership pattern of the sample IPOs is presented.

Table 4. Decision Matrix (Market Performance)

	Criteria					
	C11	C12	C13	C14	C15	C16
IPO	(+)	(+)	(+)	(+)	(+)	(-)
A1	1.563	36.870	7.910	189.895	242.587	0.910
A2	2.078	15.810	7.330	111.887	110.317	0.780
A3	-0.527	4.940	0.620	1.895	3.050	1.640
A4	0.022	-1.390	2.750	68.583	72.683	0.940
A5	-0.130	10.060	3.130	545.590	653.264	1.760
A6	0.884	8.940	2.270	60.959	45.780	1.150
A7	1.611	8.430	2.870	104.310	174.115	1.630
A8	26.846	37.500	9.470	69.994	68.274	0.780
A9	1.001	52.590	8.910	90.594	92.059	0.820
A10	1.143	32.400	1.880	19.385	20.133	1.300
A11	0.547	85.120	2.170	332.665	264.945	0.840
A12	-0.107	33.020	6.960	122.944	154.299	1.250
A13	-0.738	-19.430	1.050	38.647	92.081	0.680
A14	0.924	8.420	3.090	33.103	33.768	1.260
A15	0.594	18.440	3.120	19.815	17.984	1.070
A16	-0.421	15.730	2.490	57.829	22.592	0.820
A17	-0.192	18.830	5.100	31.235	34.393	0.790

Table 5. Decision Matrix (Fundamental Performance)

	C21	C22	C23	C24	C25
IPO	(+)	(+)	(+)	(+)	(-)
A1	12.860	3.460	3.560	1.740	10.319
A2	4.090	1.850	3.300	0.730	17.888
A3	3.410	-1.850	2.560	0.260	13.538
A4	-2.390	2.060	-2.110	0.770	48.374
A5	9.940	1.570	4.920	2.250	9.182
A6	9.210	4.100	9.100	46.690	13.531
A7	4.160	1.040	1.140	2.000	8.554
A8	16.790	12.620	14.520	4.380	4.685
A9	19.560	12.620	16.380	1.960	5.347
A10	22.780	9.830	17.840	1.990	5.161
A11	19.950	5.260	16.170	15.930	8.915
A12	71.040	13.240	25.710	11.210	5.521
A13	-7.560	-2.260	-2.490	1.270	11.529
A14	15.540	6.440	13.570	1.170	9.249
A15	22.250	12.910	20.100	17.510	4.994
A16	15.480	6.490	15.440	124.800	9.207
A17	-18.220	-9.010	-11.800	-0.020	20.571

Table 6. Equity Ownership by Non-promoters

IPO	Non-promoters (In %) - Shares held	IPO	Non-promoters (In %) - Shares held
A1	49.92	A10	25.47
A2	59.73	A11	24.85
A3	40.9	A12	25
A4	62.12	A13	6.69
A5	60.01	A14	26
A6	25.07	A15	34.28
A7	26.01	A16	27.8
A8	25	A17	67.69
A9	29.07		

3.4. LOPCOW Method for Ranking

The procedural steps for performance based ranking using the algorithm of LOPCOW are described below (Ecer and Pamucar, 2022).

Let, $X = \left[x_{ij} \right]_{m \times n}$ be the decision-matrix where, is the number of alternative options and is the number of criteria.

Step 1. Normalization of the decision-matrix

According to the basic algorithm, a linear max-min type of normalization is used. The normalized decision matrix is given by

$R = \left[r_{ij} \right]_{m \times n}$ where,

$$r_{ij} = \frac{x_{ij} - x_{\min}^{j}}{x_{\max}^{j} - x_{\min}^{j}} \text{ (when } j \in j^{+} \text{ , maximizing effect)} \quad (1)$$

$$r_{ij} = \frac{x_{\max}^{j} - x_{ij}}{x_{\max}^{j} - x_{\min}^{j}} \text{ (when } j \in j^{-} \text{ , minimizing effect)} \quad (2)$$

Step 2. Calculation of the Percentage Value (PV)

The PV for each criterion is obtained by expressing the mean square value as a percentage of the standard deviation using natural log. This step helps to reduce the gap which may occurred due to size of the data. Accordingly, the expression for PV is given as under

$$P_{ij} = \left| \ln \left(\frac{\sqrt{\sum_{i=1}^{m} r_{ij}^{2}}}{\sigma} \right) .100 \right| \quad (3)$$

where σ denotes the standard deviation.

Step 3. Computation of criteria weights

The weight for the j^{th} criterion is given by

$$w_j = \frac{P_{ij}}{\sum_{j=1}^{n} P_{ij}} \quad (4)$$

Where, $\sum_{j=1}^{n} w_j = 1$ (i.e., sum of the weights of all criteria = 1)

Step 4. Obtain the performance value of the alternatives

The performance value of i^{th} alternative is given as

$$S_i = \sum_{j=1}^{n} w_j r_{ij} \quad (5)$$

Decision rule: Higher is the value of S_i preferable is the corresponding alternative.

4. Results

First, we show the step by step findings related to market performance. Table 7 shows the normalized decision matrix obtained by using table 4 and expressions (1) and (2).

Table 7. Normalized Decision Matrix (Market Performance)

	Criteria					
	C11	C12	C13	C14	C15	C16
IPO	(+)	(+)	(+)	(+)	(+)	(-)
A1	0.0834	0.5385	0.8237	0.3458	0.3684	0.7870
A2	0.1021	0.3371	0.7582	0.2023	0.1650	0.9074
A3	0.0076	0.2331	0.0000	0.0000	0.0000	0.1111
A4	0.0275	0.1725	0.2407	0.1227	0.1071	0.7593
A5	0.0220	0.2821	0.2836	1.0000	1.0000	0.0000
A6	0.0588	0.2714	0.1864	0.1086	0.0657	0.5648
A7	0.0851	0.2665	0.2542	0.1884	0.2631	0.1204
A8	1.0000	0.5445	1.0000	0.1253	0.1003	0.9074
A9	0.0630	0.6889	0.9367	0.1631	0.1369	0.8704
A10	0.0682	0.4957	0.1424	0.0322	0.0263	0.4259
A11	0.0466	1.0000	0.1751	0.6084	0.4028	0.8519
A12	0.0229	0.5017	0.7164	0.2226	0.2326	0.4722
A13	0.0000	0.0000	0.0486	0.0676	0.1369	1.0000
A14	0.0602	0.2664	0.2791	0.0574	0.0472	0.4630
A15	0.0483	0.3622	0.2825	0.0330	0.0230	0.6389
A16	0.0115	0.3363	0.2113	0.1029	0.0301	0.8704
A17	0.0198	0.0057	0.5062	0.0540	0.0482	0.8981

Table 8 provides the values of SD, PV, and weights for the criteria (i.e., indicators of market performance) calculated using the expressions (3) and (4). It is evident from table 8 that indicates that risk, earning per share, and market price to book value emerged as the top priorities.

Table 8. Criteria Weights (Market Performance)

Item	Criteria					
	C11	C12	C13	C14	C15	C16
SD	0.2418	0.2437	0.3340	0.2483	0.2396	0.3334
P_{ij}	2.5923	59.1325	41.9992	24.4238	22.1044	73.7790
w_j	0.0116	0.2639	0.1875	0.1090	0.0987	0.3293

Moving forward we find out the comparative ranking order of the IPOs based on their market performance using the expression (5) and table (7). Table 9 exhibits the ranking of the IPOs as per their performance.

It is seen that Aavas Financiers Ltd. (A1), Hindustan Aeronautics Ltd. (A11) and Fine Organic Inds. Ltd. A8) hold the top three positions while Apollo Micro Systems Ltd. (A3), Creditaccess Grameen Ltd. (A7) and Mishra Dhatu Nigam Ltd. (A14) secure the bottom three places as per their market performances. We now move to find out the fundamental performance of the IPOs. Table 10 exhibits the normalized decision matrix and table 11-12 provide the criteria weights and performance based ranking of the IPOs under study following the process used in determining the market performance based ranking as given above.

Table 9. Ranking of IPOs (Market Performance)

IPO	Criteria						S_i	Rank
	C_{11}	C_{12}	C_{13}	C_{14}	C_{15}	C_{16}		
A_1	0.0010	0.1421	0.1544	0.0377	0.0363	0.2592	0.6308	1
A_2	0.0001	0.0300	0.1078	0.0045	0.0027	0.2712	0.4162	5
A_3	0.0000	0.0143	0.0000	0.0000	0.0000	0.0041	0.0184	17
A_4	0.0000	0.0079	0.0109	0.0016	0.0011	0.1898	0.2113	11
A_5	0.0000	0.0210	0.0151	0.1090	0.0987	0.0000	0.2438	10
A_6	0.0000	0.0194	0.0065	0.0013	0.0004	0.1051	0.1328	13
A_7	0.0001	0.0187	0.0121	0.0039	0.0068	0.0048	0.0464	16
A_8	0.0116	0.0783	0.1875	0.0017	0.0010	0.2712	0.5512	3
A_9	0.0000	0.1252	0.1645	0.0029	0.0018	0.2495	0.5440	4
A_{10}	0.0001	0.0649	0.0038	0.0001	0.0001	0.0597	0.1286	14
A_{11}	0.0000	0.2639	0.0058	0.0404	0.0160	0.2390	0.5651	2
A_{12}	0.0000	0.0664	0.0962	0.0054	0.0053	0.0734	0.2468	9
A_{13}	0.0000	0.0000	0.0004	0.0005	0.0018	0.3293	0.3321	6
A_{14}	0.0000	0.0187	0.0146	0.0004	0.0002	0.0706	0.1045	15
A_{15}	0.0000	0.0346	0.0150	0.0001	0.0001	0.1344	0.1842	12
A_{16}	0.0000	0.0299	0.0084	0.0012	0.0001	0.2495	0.2889	8
A_{17}	0.0000	0.0000	0.0480	0.0003	0.0002	0.2657	0.3143	7

Table 10. Normalized Decision Matrix (Fundamental Performance)

IPO	Criteria				
	C_{21}	C_{22}	C_{23}	C_{24}	C_{25}
A_1	0.3482	0.5604	0.4095	0.0141	0.8711
A_2	0.2499	0.4881	0.4026	0.0060	0.6978
A_3	0.2423	0.4975	0.3828	0.0022	0.7974
A_4	0.1773	0.3218	0.2583	0.0063	0.0000
A_5	0.3155	0.4755	0.4457	0.0182	0.8971
A_6	0.3073	0.5892	0.5572	0.3742	0.7975
A_7	0.2507	0.4517	0.3450	0.0162	0.9114
A_8	0.3922	0.9721	0.7017	0.0353	1.0000
A_9	0.4233	0.9721	0.7513	0.0159	0.9849
A_{10}	0.4593	0.8467	0.7902	0.0161	0.9891
A_{11}	0.4276	0.6413	0.7457	0.1278	0.9032
A_{12}	1.0000	1.0000	1.0000	0.0900	0.9809
A_{13}	0.1194	0.3034	0.2482	0.0103	0.8434
A_{14}	0.3782	0.6944	0.6764	0.0095	0.8955
A_{15}	0.4534	0.9852	0.8504	0.1404	0.9929
A_{16}	0.3775	0.6966	0.7262	1.0000	0.8965
A_{17}	0.0000	0.0000	0.0000	0.0000	0.6364

Table 11. Criteria Weights (Fundamental Performance)

Item	Criteria				
	C_{21}	C_{22}	C_{23}	C_{24}	C_{25}
SD	0.2255	0.3368	0.2806	0.2421	0.2574
P_{ij}	58.0916	69.4288	76.4865	8.7702	120.6939
w_j	0.1742	0.2082	0.2294	0.0263	0.3619

Table 12. Ranking of IPOs (Fundamental Performance)

IPO	Criteria					S_i	Rank
	C_{21}	C_{22}	C_{23}	C_{24}	C_{25}		
A_1	0.0607	0.1167	0.0939	0.0004	0.3153	0.5869	6
A_2	0.0109	0.0496	0.0372	0.0000	0.1762	0.2739	15
A_3	0.0102	0.0515	0.0336	0.0000	0.2301	0.3255	13
A_4	0.0055	0.0216	0.0153	0.0000	0.0000	0.0423	17
A_5	0.0173	0.0471	0.0456	0.0000	0.2913	0.4013	10
A_6	0.0165	0.0723	0.0712	0.0037	0.2302	0.3938	11
A_7	0.0110	0.0425	0.0273	0.0000	0.3007	0.3814	12
A_8	0.0268	0.1968	0.1129	0.0000	0.3619	0.6985	4
A_9	0.0312	0.1968	0.1295	0.0000	0.3511	0.7085	3
A_{10}	0.0368	0.1493	0.1432	0.0000	0.3541	0.6833	5
A_{11}	0.0319	0.0856	0.1275	0.0004	0.2953	0.5407	8
A_{12}	0.1742	0.2082	0.2294	0.0002	0.3482	0.9602	1
A_{13}	0.0025	0.0192	0.0141	0.0000	0.2574	0.2932	14
A_{14}	0.0249	0.1004	0.1049	0.0000	0.2903	0.5205	9
A_{15}	0.0358	0.2021	0.1659	0.0005	0.3568	0.7611	2
A_{16}	0.0248	0.1010	0.1210	0.0263	0.2909	0.5640	7
A_{17}	0.0000	0.0000	0.0000	0.0000	0.1466	0.1466	16

We notice that $C_{25} \succ C_{23} \succ C_{22} \succ C_{21} \succ C_{24}$ which means risk (leverage) and profitability aspects other than liquidity obtain importance. This is justified from financial perspective as during initial years return and risk are of importance to business operations for ensuring steady growth. Further, we observe that I C I C I Securities Ltd. (A12), Newgen Software Technologies Ltd. (A15) and Galaxy Surfactants Ltd. (A9) hold top three positions while Aster D M Healthcare Ltd. (A4), T C N S Clothing Co. Ltd. (A17) and Amber Enterprises India Ltd. (A2) are in the bottom bracket. It may be noted that the market performance is not in sync with the fundamental performance. We calculate Spearman's rank correlation between market and fundamental performance based rankings which comes out as statistically insignificant. The reasons could be overpricing of some stocks, inclination of the investors toward certain sectors and decisions driven by market hype among others. Also, it may be noted that for the fundamental performance, government ownership has not played a significant role. These points we elaborate in the discussion section. To arrive at the overall ranking of the IPOs, we use the following expression.

$$S_{i(final)} = \xi S_{i(market)} + (1-\xi) S_{i(fundamental)} \quad (6)$$

Here, ξ represents the differentiating index which lies between 0 and 1. It allows the decision-makers some flexibility to put relative priorities on market based performance and fundamental performance as per their preferences. In this paper, we assume equal priority, i.e., $\xi = 0.5$. The overall ranking of the IPOs is given in Table 13. We notice the consistency of the market based rank and fundamental performance based rank with the overall performance (see table 14).

Table 13. Overall Performance based Ranking

Company	Final Score	Overall_Rank
A_1	0.6088	3
A_2	0.3450	9
A_3	0.1720	16
A_4	0.1268	17
A_5	0.3225	10
A_6	0.2633	13
A_7	0.2139	15
A_8	0.6248	2
A_9	0.6263	1
A_{10}	0.4060	8
A_{11}	0.5529	5
A_{12}	0.6035	4
A_{13}	0.3127	11
A_{14}	0.3125	12
A_{15}	0.4727	6
A_{16}	0.4265	7
A_{17}	0.2304	14

Table 14. Correlation between Overall, Market and Fundamental Performance

Coefficient	Aspect	Market_rank	Fundamental_rank
Spearman's rho	Overall_rank	.684**	.828**

** Correlation is significant at the 0.01 level (2-tailed).

For any MCDM based ranking, one of the important requirements is to check the validity of the results. In this paper, we follow the approaches taken in the past work (e.g., Biswas and Anand, 2020; Pamucar et al., 2021; Biswas et al., 2021a, 2021b, 2021c; Pamucar et al., 2022) that compares the result of the used method with the

same derived by using other models. We calculate the criteria weights and perform the ranking of the IPOs using the widely used Entropy method with the procedural steps mentioned in Biswas et al. (2022f) and compare the results by using Spearman's Rank Correlation test for both market and fundamental performance. It is evident (see tables 15 and 16) that the results obtained by using LOPCOW method are consistent with Entropy method.

Table 15. Correlation between ranking (market performance) of LOPCOW and Entropy

Coefficient	Method	Entropy rank
Spearman's rho	LOPCOW rank	.652**

**. Correlation is significant at the 0.01 level (2-tailed).

Table 16. Correlation between ranking (fundamental performance) of LOPCOW and Entropy

Coefficient	Method	Entropy rank
Spearman's rho	LOPCOW rank	.770**

**. Correlation is significant at the 0.01 level (2-tailed).

Stability of result obtained through MCDM based analysis is of utmost importance to understand the impact of the changes in the given conditions (Biswas et al., 2022g). Hence, we further vary the values of ξ (such as 0.2, 0.4, 0.6 and 0.8) to observe the sensitivity of the overall ranking given the changes in the preference of the decision-makers toward market based and fundamental performances. Figure 1 reflects that our model provides quite a stable result.

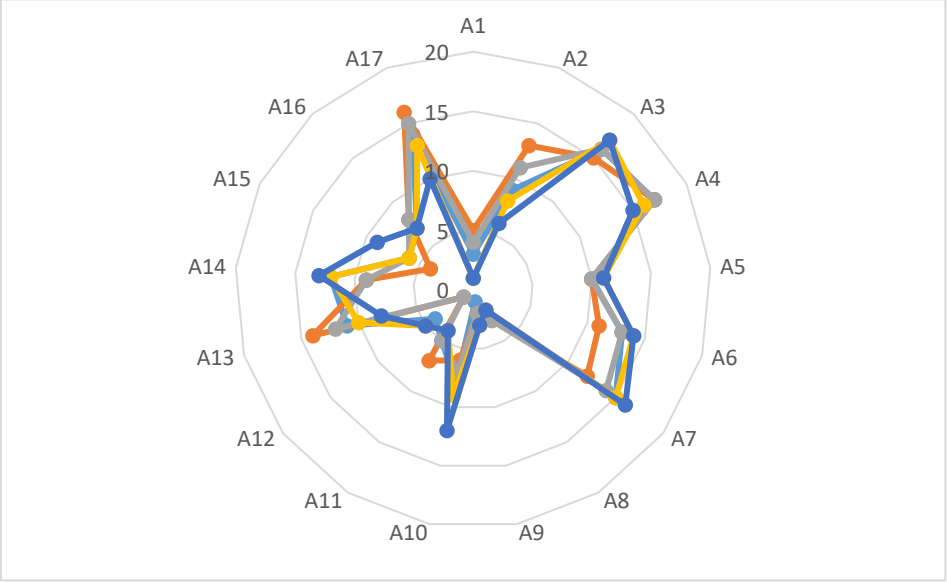

Figure 1. Sensitivity Analysis

5. Discussions

The present paper provides a number of useful observations. Firstly, from the comparison of the market and overall performance, it is observed that IPOs which are perceived well by investors in the market (A1, A11, and A8) have not shown at par overall performance. It is seen that two of the top three IPOs (as per market performance) hold comparatively lower positions based on overall performance. On the other hand, the IPOs belonging to the bottom group of the market performance (i.e., A3, A7, and A14) show appreciation in the comparative overall ranking. These observations imply that the top market performers have been over-priced by the investors while the bottom performers remained under-priced. Second, considering the fundamental

performance vis-a-vis overall rank, we notice that the companies holding top places as per fundamental performance do not show similar ranking on overall performance. This is because the IPOs which perform well fundamentally do not show their immediate reflection in the market sentiment. However, there is an indication of appreciation in the overall and market rank with respect to their corresponding fundamental positioning. Further, we observe that pattern of equity ownership such as % shares hold by non-promoters is not a significant factor influencing the post-listing performance of the IPOs (refer to Table 6). This contradicts the general notion of agency cost issue.

In this context, it may be worthy to mention the observations made by Lowry (2003) which stated that the variation in the traded volume of IPOs (an indicator of market performance) is significantly influenced by investor sentiments. In a recent study (Ogunlusi and Obademi, 2021) in the context of investigating the impact of prospect theory and heuristics on investment decision-making from behavioural point of view, the researchers mentioned that the behaviour of the investors at the market place is mostly driven by the cognitive bias which contradicts the rational judgement based on fundamental and technical analysis. After the listing of the IPOs understudy, the stock market has undergone the effect of COVID-19 and the subsequent global slowdown, during a significant part of the time window i.e., 2018-2021. During this period the sentiments of the investors have been driven by market news and prevailing conditions of COVID-19. Therefore, the results of our analysis may be justified because of the investor's short-term motive, the industry wise differential impact of COVID-19, and market volatility.

5.1. Implications

The present paper provides a number of policy implications such as

a) Given the impact of the recent pandemic, this paper may help the policy makers to strengthen their financial policies and put focus on improving the fundamental performance for long-run sustenance of the market performance and growth.
b) In recent times, there has been several cases in India (as reported) wherein even Government backed IPOs did not perform well despite having a promising listing. The current paper provides a framework to benchmark the performance of the IPOs after launch for the policy-makers and market analysts that may help in effective financial planning and forecasting preventive measures.

Further, from the point of public (i.e., investors), the present study reinstates the need for adopting rational investment decision-making by carefully analysing fundamental, technical and market performances for long-term return of the investment. The investors may use the current study as a guideline for financial planning, especially for selection of IPOs for investment. From technical point of view, the present paper extends the use of LOPCOW method for solving a relevant real-life problem of investment analysis in VUCA world amidst the effect of Covid-19.

6. Conclusion and Future Scope

In the present study, a comparative analysis of 17 IPOs (listed in the stock market in 2018) has been carried out on the basis of the market performance and fundamental financial performance. A post-listing stabilization period of three years has been considered and the analysis is carried out as on the financial year 2020-21. For assessing market performance, return, earning per share, price to book value, market capitalization, market value and risk measure (such as Beta) are taken as the attributes. On the other hand, the present study considers profitability, liquidity and leverage as the basis for comparing fundamental financial performance. For performance-based ranking purpose, the recently developed algorithm LOPCOW has been utilized. The results show that the market performance does not get reflected in the fundamental financial performance. The top market performers have been over-priced by the investors while the bottom performers remained under-priced. IPOs which perform well fundamentally do not show their immediate reflection in the market sentiment. However, there is an indication

of appreciation in the overall and market rank with respect to their corresponding fundamental positioning. Further, we observe that pattern of equity ownership such as % shares hold by non-promoters is not a significant factor influencing the post-listing performance of the IPOs. The result of validation test indicates that the ranking using LOPCOW method is comparable and consistent with a widely used model like Entropy.

However, the present paper has a number of future scopes. Firstly, a future study may further delve deep into exploring the association of the industry type (of the IPOs) with the market and fundamental performances. Further, there is a future scope for examining the impact of corporate governance, operational performance and dividend policy on the post-listing performance of the IPOs. Thirdly, there may be a future work that investigates the causal association of macroeconomic indicators such as Foreign Direct Investment (FDI), global stock market reactions, oil, gold and dollar price on IPO performance given the backdrop of Covid-19. Fourthly, as the current work reveals an indication of the influence of psychological choices of investment, there may be a further work examining the IPO performance using the theoretical lens of utility theory, prospect theory and heuristics. Fifthly, from a technical point of view, the present paper may be extended for utilizing LOPCOW for group decision-making in an uncertain environment with imprecise information. Nevertheless, the present paper assumes its importance from policy making and public interest point of view. We are hopeful that our paper shall draw attention of the researchers and practitioners in future**.**

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