CHAPTER-5

ANALYSIS OF IMPACT OF RISK CATEGORIES ON IPO PERFORMANCE

This chapter statistically analyses the data which is collected in the study to see the impact of risk factor categories on IPO performance. The relationships between the risk factors which are disclosed in the Risk Factor Section of the prospectus are examined with the stock pricing as well as under-pricing. The impact of mutually exclusive risk categories on the performance of IPO in the short run is analysed in the form of extent of under-pricing on the first day of listing and the post-listing days. This impact is investigated on Initial day return which is classified under the two market scenarios as primary market under-pricing and under-pricing in secondary market on initial day and subsequent period.

5.1 INTRODUCTION

The emergence of risk in the IPO market is indispensable due to the volatility of the IPO prices in the stock market (Wasiuzzaman et al., 2018). It has been observed, theoretically and empirically, that the risk factor disclosure has the potential to change a firm's risk premium and variance (Heinle & Smith, 2017). The greater the disclosure, the less information asymmetry exists between companies and investors. Investors and financial analysts find such disclosure advantageous in their investment decisions. Corporate finance theory also indicates that greater disclosure lowers the cost of capital. The decision to purchase, sell, or retain any company's stock is based on an investor's expectation of potential cash flow and return distributions from that company (Abdel-azim & Abdelmoniem, 2015). The disclosure influences the amount of the discount to the offer price and thus affects the value of IPOs. The returns on the first day could swing on either the positive or negative side, but in some cases, it can be fairly priced. Generally, it is seen that IPOs usually give very high returns on the first day. When the shares of any company are traded in the aftermarket at a price (typically proxied by the first listing trading day closing price) which is higher than the initial offer price at which the company offers its shares to the underwriter, it is termed "under-pricing," while "overpricing" refers to the situation when the listing price is much lower than the issue price. This price performance of IPOs is considered

the market performance of IPOs, which includes both short-run under-pricing and long-run underperformance.

Forecasting of short-run market performance is an important aspect of the IPO. It has been examined by many researchers using first-day returns to evaluate short-run market performance. Initial market performance is measured using the level of under-pricing of IPOs in existing research. Therefore, in line with past researchers, the IPO market performance is measured by calculating the initial day and subsequent returns in the short run. The date on which the shares of any company are offered for sale to investors on a public stock exchange for the first time is considered the first trading date. The IPO's issue price is the first and foremost price that ought to be considered, as it is the price at which the firm offers its stock for sale on the first day of trading. The first day of trading can be considered trading in the primary market as it gives the IPO opening price at the beginning of the first listing day, which is determined on the basis of the IPO issue price. It can also be considered trading in the secondary market that reflects the first-day closing prices, based on stock opening prices, demand and supply of existing stock, and market forces. The study is further extended to a post-day listing analysis that includes IPO performance up to three months, measuring the stock price after one week, after two weeks, after three weeks, after one month and after three months of trading.

When any firm considers issuing an IPO in the primary market, the most important consideration to be made is the price at which the IPO will be released. Most firms try to keep the issue price as high as possible in order to raise as much money as possible to finance their firm, but a high IPO issue price can result in an under subscription of the issue. According to the Company Law (2013), if the subscription is less than 90%, the IPO must be cancelled and the money proceeds returned to the investors. Since the firms would incur expenses on a regular basis, they do not want their IPO to crash in the main sector due to under subscription. As a result, when issuing an IPO, firms attempt to determine fair and lucrative offer prices with the assistance of investment bankers and underwriters. They insist on certifying that the issue price accounts for all relevant inside information about the past performance, risk factors, and future plans and payoffs. On the other hand, when an IPO is launched, the market participants start analysing the future prospects of the company, keeping in mind the management's

view on internal and external risks to the company's future plans and the forward-looking statements about the company mentioned in the prospectus. If the investors perceive the company's excellent potential prospects, they may apply for the IPO, causing the IPO to be oversubscribed. As a result of the high demand in the market, the IPO price will rise on the day of listing. The market price discovery process will begin with the analysis performed by various types of investors in the market and the perception of retail investors. The listing price of the IPO is determined by demand and supply forces in the primary market on the day of listing in the price discovery process. The IPO is deemed to be under-priced when the selling price of any stock is higher than the issue price on the listing date. On the other hand, the IPO is considered overpriced if the listing price is lower than the issue price. It can be argued that the under-pricing effect is the product of market participants' decisions taken between the offering day and the first trading day. Ritter & Welch (2002) further inferred that IPO anomalies are caused by incidents that occur between day 0 and day 1 of listing. Prior to the IPO, the prospectus was regarded as the main source of the firm's information to investors. Examining the explanatory power of prospectus information to price IPOs, Klein (1996) found that it is strongly related to both the offer price and the first-day market price. Then, any different behaviour of any prospectus information may explain the "mispricing" of the IPO, also known as the "under-pricing." In the present study, the relationship between the risk factors that are disclosed in the Risk Factor section of the prospectus is examined with the IPO initial pricing as well as under-pricing.

5.2 ANALYSIS OF IMPACT OF RISK CATEGORIES ON STOCK PRICES ON THE INITIAL DAY AS WELL AS IN SUBSEQUENT WEEKS

This chapter statistically analyses the data collected in the study to see the impact of risk factor categories on IPO performance. Risk factor categories have already been identified in Chapter 4. The presentation of risk factors across categories (depending on their nature) should help investors in navigating the risk factors section. The six risk categories that are recognised through factor analysis, namely Operating Risk, Compliance Risk, Managerial Risk, Equity Risk, Financial Risk, and Technological & Competitive Risk, along with three control variables, are used as independent variables in the regression analysis. The impact of risk factors on IPO performance is

measured in two ways: first by analysing their impact on initial and subsequent stock prices, and second by analysing their impact on under-pricing.

5.2.1 Regression Equations and Hypotheses used for analysis

The relationship between the risk factors and IPO performance, measured as stock prices on the initial day as well as in subsequent weeks, is modelled as per the following OLS Regression Equations:

$$ISSP = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCHGSENSX + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(i)$$

$$LDOP = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCHGSENSX + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(ii)$$

$$LDCP = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCHGSENSX + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(iii)$$

$$PA1W = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCSENSX1W + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(iv)$$

$$PA2W = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCSENSX2W + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(v)$$

$$PA3W = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCSENSX3W + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(vi)$$

$$PA1M = \alpha + \beta(1)\,FAGE + \beta(2)\,ISSIZE + \beta(3)\,PRCSENSX1M + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MNGRRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots\ldots(vii)$$

PA3M= α + β (1) FAGE + β (2) ISSIZE + β (3) PRCSENSX3M + β (4) OPRRISK + β (5) COMPRISK + β (6) MNGRRISK+ β (7) EQRISK + β (8) FINRISK + β (9) TECHCMPRISK + ε ……(viii)

In addition to the dependent and independent variables, β_1 to β_{10} are the regression coefficients, which indicate how a change in a predictor variable impacts the dependent variable when all other predictors are held constant. The 'α' denotes the constant, the intercept of the regression model, which suggests that what will be the dependent variable considering all of the independent variables as zero. 'ε' represents the residuals.

To investigate whether the risk factor disclosure in the prospectus has an impact on IPO performance, the following short-run market performance hypotheses have been developed:

H_{01}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Issue Price.

H_{02}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and IPO Listing Day Opening Price.

H_{03}: There is no significant relationship between the extent of risk factors disclosure in different risk categories and IPO Listing Day Closing Price.

H_{04}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after one week (PA1W).

H_{05}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after two weeks (PA2W).

H_{06}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after three weeks (PA3W).

H_{07}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after one month (PA1M).

H_{08}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and IPO stock price after 3 months (PA3M)

5.2.2 Variables used in Regression Analysis

Eight dependent variables have been used to measure the impact of risk factor categories on IPO performance. The first variable is the' Issue Price' (ISSP) or percent premium. This price reflects the price at which the firm's stock will be offered to initial investors on the first day of trading. It is measured as the natural log value

(LnIssuePrice) of the issue price of firms. The second dependent variable is 'Listing Day Opening Price' (LDOP), measured as the natural log value (LnOpeningPrice) of the listing day opening price of firms. The opening price is the price at which newly issued shares begin trading on an exchange on its first trading day. This price reflects the opening price performance in the primary market, whereas the third dependent variable, 'Listing Day Closing Price' (LDCP), measures the first day IPO performance in the secondary market. It is measured as the natural log value (LnClosingPrice) of the listing day closing price of firms. The post-first day performance after every week is measured as "Stock Price After One Week" (PA1W), "Stock Price After Two Weeks" (PA2W), "Stock Price after Three Weeks" (PA3W), "Stock Price after One Month" (PA1M) and "Stock Price after Three Months" (PA3M). These stock prices are considered the fourth, fifth, sixth, seventh, and eighth dependent variables, respectively, and are measured as the natural log value of the post-day stock price for the same interval. These variables are LnPA1W, LnPA2W, LnPA3W, LnPA1M, and LnPA3M.

The control variables used in the regression equation are: "Firm Age" (FAGE)-the natural logarithm of one plus the number of years since the firm was established (LnFirmAge), and "Issue Size" (ISUSIZE)-the natural log value (LnIssueSize) of the issue size offered by the firms.

The Percentage Change in Market Sensex (PRCHGSENSX)- It is calculated as the natural log of the percentage change in the market index (Nifty50) from the day of offer to the closing market index price on the first day of listing (LnPrchgsensx). The post-day percentage change in the market index is also calculated as the natural log of the percent change from the issue day index for the same interval as the dependent variables (LnPrcsensx1w, LnPrcsensx2w, LnPrcsensx3w, LnPrcsensx1m, and LnPrcsensx3m).

The independent variables are labelled for use in regression analysis in SPSS as F1-Operational Risk (OPRRISK), F2-Compliance Risk (COMPRISK), F3-Managerial Risk (MNGRRISK), F4-Equity Risk (EQRISK), F5-Financial Risk (FINRISK), and F6-Technological & Competitive Risk (TECHCMPRISK).

The logarithm value of most of the variables is generally used in regression analysis. It is a very common way to transform a highly skewed variable into a more normal variable or to handle situations where a non-linear relationship exists between the dependent variable and the independent variables (Carter et al., 2011).

5.2.3 Regression Analysis: Methodological Issues

To run the OLS regression correctly, several data requirements and assumptions need to be tested before undertaking a regression analysis. These are the following:

(i) Sample size: The first data requirement is that the sample size be large enough. A minimum acceptable sample size is required so that we have a good chance of finding significant results. Green (1991) suggested a rule of thumb for sample size as 104+k for regression analysis. (Here k is the number of independent variables in the study). The minimum number of observations required for the study is 104+9=113 (there are 9 independent variables in the study). The sample size in the present study is 131, which is an acceptable sample size for regression analysis.

(ii) The variables need to vary. A regression model cannot be estimated if the variables have no variation. In our study, all the variables, whether dependent or independent, vary. Hence, it is suitable for applying regression analysis.

(iii)The third data requirement is that the data be tested for multicollinearity. There should be no or little collinearity in the data. Multi-collinearity occurs when the two or more independent variables in a regression model are highly correlated. It makes regression analysis difficult and leads to an over-fitting problem. Multicollinearity among the variables should be checked before using them in a regression model. Collinearity can be detected by calculating the tolerance or variance inflation factor (VIP). If the VIF value is higher than 10 (O'brien, 2007), and the tolerance, which is just the reciprocal value of the VIF, is below 0.10, it is generally presumed that independent variables are highly correlated. It indicates the collinearity issues. In the current study, there is no multicollinearity among all variables because VIF is less than 10 and tolerance values are greater than 0.10 for all variables, none of which is greater than 2.5. It suggests that multicollinearity is not an issue and, therefore, all variables are retained in the study.

(iv) That the dependent variable needs to be interval or ratio scaled. If the data is not interval or ratio scaled, alternative types of regression need to be used.

(v) As in our study, we had data with a time component, so the Durbin–Watson test was also performed to test for potential autocorrelation in residuals. It assesses the strength of the relationship between variables and, for modelling, the future relationship between them. Autocorrelation violates the assumption

of independence. The Durbin-Watson statistic in our study is near 2 (1.977, 1.984, 1.974, 2.078, 2.072, 2.043, 2.037, and 2.019, respectively for models 1 to 8), which indicates non-autocorrelation in residuals. A rule of thumb for this test statistic is that values in the range of 1.5 to 2.5 are relatively normal.

(vi) Lastly, we can check the normality of residuals with a normal P-P plot. The normal probability plot of the residuals should approximately follow a straight line. The residuals are assumed to follow the normal probability distribution with a zero mean and constant variance.. At a 5% significance level, the existence of any extreme outliers is enough to rule out normality. Mild outliers can be seen in any sample size. The graph Figure-5.0, 5.1, and 5.2 shows that residuals have an approximately normal distribution in the present study in Models 1 to 3, and other models also follow the same pattern. It proves that there is no problem with homoscedasticity and that the normal distribution of errors is related to the residual.

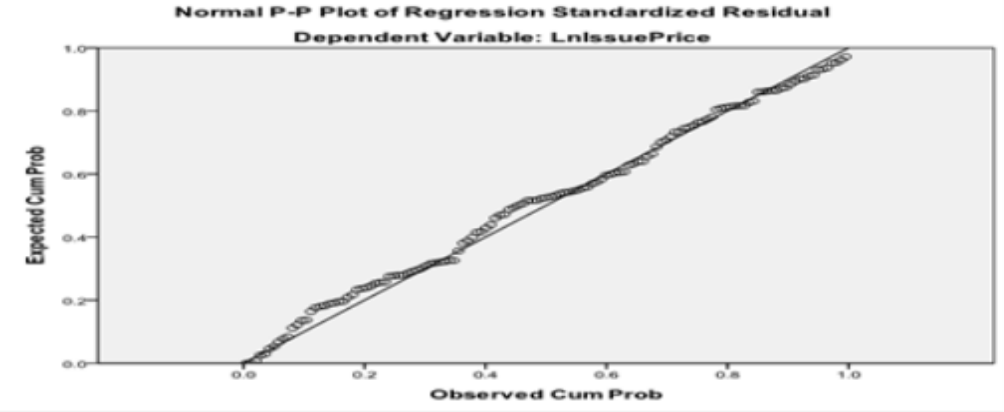

Figure 5.1: Normal P-P Plot of Regression Standardized Residual- LnIssuePrice

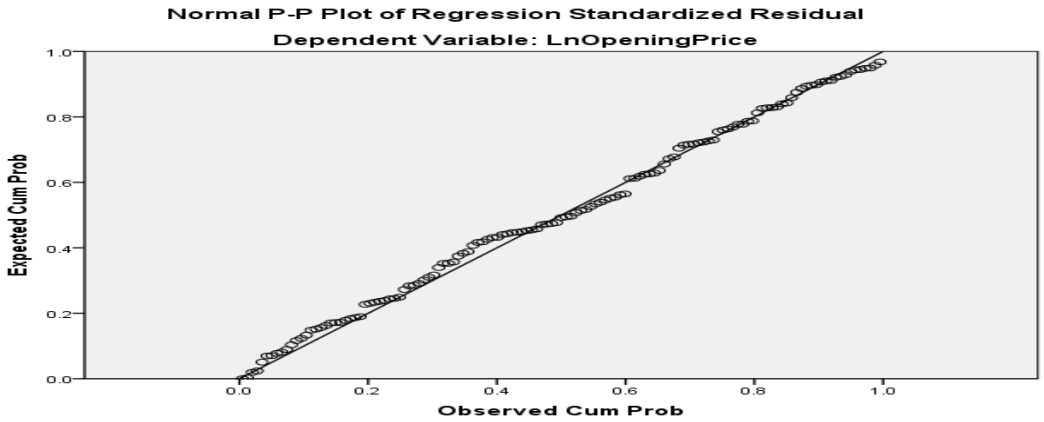

Figure 5.2: Normal P-P Plot of Regression Standardized Residual-LnOpeningPrice

(Source: SPSS data output)

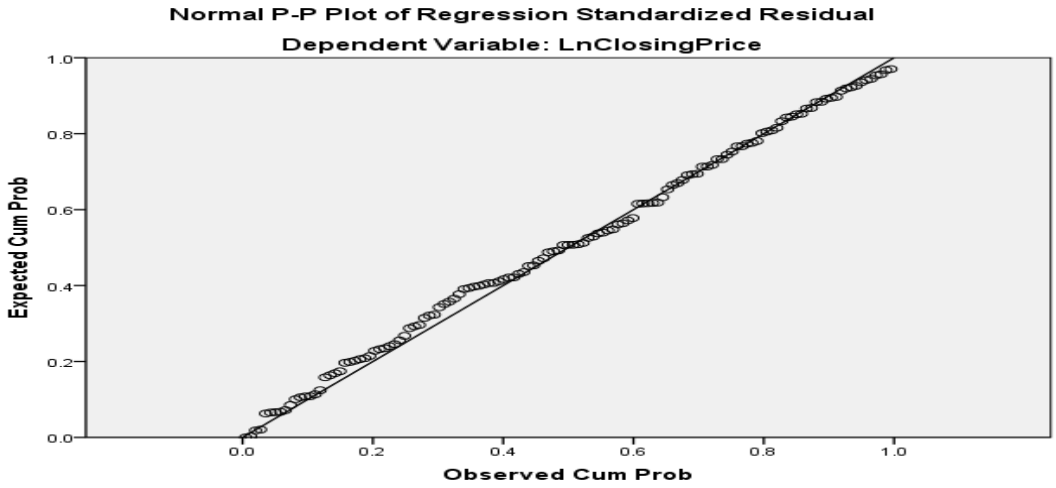

Figure 5.3: Normal P-P Plot of Regression Standardized Residual-LnClosingPrice

Regression analysis can be performed in two ways: either beginning to regress with the dependent and the independent variables and adding the control variables; or starting by analysing the relationship between the dependent and the control variables and then adding the predicators. The latter will demonstrate the independent variable's gradual explanatory power. Hence, the second approach is applied in the present study using SPSS. Commencing with a regression of the dependent variable and the control variables (‘Issue Size’, ‘Firm’s Age', and ‘Percentage Change in Market Sensex'), the independent variables are added to the initial regression analysis to establish a potential improvement in the adjusted fit of the model. This regression method was tested on the first three models. The results highlight the differences in outcomes, showing the improvement in adjusted R square. The figures in brackets in Table 5.1 show the outcomes using regression of dependent variable and control variable only (predictors as Constant, LnPrchgsensx, LnFirmAge, and LnIssueSize), while the main figures are the outcomes of the regression equation with control variables and independent variables (F1, F2, F3, F5 and F6). Model 1 to Model 3 show the reclamation in adjusted R^2 from .305, .278 and.285 to.322, .306 and .296 respectively. So, keeping in view of the improvement in overall fit while retaining all the variables (no multicollernity issue), the ‘Enter’ method is used in the present study for the regression method.

5.2.4 Overall Fit of the Model

The overall model fit can be accessed through the (adjusted) R^2 and the significance of the F-value. Table 5.1, labelled "Models Summary," gives an overview of the regression results. Firstly, R-value, R-square and adjusted R-square values are of

particular concern. The association between the dependent and independent variables is represented by the R-value (coefficient of correlation).

Table-5.1: Regression Models Summary- Impact of Risk Categories on Initial and Subsequent Stock Prices

Model	R	R^2	Adj. R^2	S. E. Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.608[a] (.567)	.369 (.321)	.322 (305)	.72706 (.73640)	.369 (.321)	7.875 (20.014)	9 (3)	121 (127)	.000 (.000)	1.977 (1.932)
2	.595[a] (.543)	.354 (.294)	.306 (.278)	.73845 (.75359)	.354 (.294)	7.383 (17.664)	9 (3)	121 (127)	.000 (.000)	1.984 (1.973)
3	.587[a] (.234)	.345 (.285)	.296 (.268)	.75396 (.76850)	.345 (.268)	7.070 (16.903)	9 (3)	121 (127)	.000 (.000)	1.974 (1.964)
4	.540[a]	.292	.239	.90592	.292	5.546	9	121	.000	2.078
5	.538[a]	.290	.237	.90739	.290	5.484	9	121	.000	2.072
6	.531[a]	.281	.228	.90611	.281	5.266	9	121	.000	2.043
7	.522[a]	.273	.219	.90536	.273	5.039	9	121	.000	2.037
8	.522[a]	.272	.218	.93001	.272	5.031	9	121	.000	2.019

Predictors-Model (1-3) a. Predictors: F6, F5, F4, F3, F2, F1, LnFirmAge, LnPrchgsesx, LnIssueSize Model4 a. Predictors: (Constant), LnPrcsensx1w, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6. Model5 a. Predictors: (Constant), LnPrcswnsx2w, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6. Model6 a. Predictors: (Constant), LnPrcsensx3w, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6. Model7 a. Predictors: (Constant), LnPrcsensx1m, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6. Model8 a. Predictors: (Constant), LnPrcsensx3m, LnFirmAge, LnIssueSize F1, F3, F2, F4, F5, F6. **Dependent Variables**- Model1 b. Dependent Variable: LnIssuePrice, Model2 b. Dependent Variable: LnOpeningPrice, Model3 b. Dependent Variable: LnClosingPrice, Model4 b. Dependent Variable: LnPA1W, Model5 b. Dependent Variable: LnPA2W, Model6 b. Dependent Variable: LnPA3W, Model7 b. Dependent Variable: LnPA1M, Model8 b. Dependent Variable: LnPA3M

The table5.1 shows that all the regression models (1–8) used in the present study have R values of .608,.595,.587,.540,.538,.531,.522, and.522 respectively, which is good. The adjusted R^2 statistics of the model are a measure of how close the data are to the regression line *(Frost, J. 2013)*. R-squared represents the proportion of the variation in the dependent variable (LnIssuePrice, LnOpeningPrice, LnClosingPrice) that can be explained by variation in the independent variables (LnPrchgsensx, LnFirmAge, LnIssueSize, F6, F5, F4, F3, F2 and F1). The R-square for the overall models (1-3) is 36.9%, 35.4%, and 34.5% with an adjusted R^2 of 32.2%, 30.6%, and 29.6%,

respectively, for Models 1 to 3, which shows that more than 34% of the variation in issue price, listing day opening price, and listing day closing price can be explained by differences in dependent variables, representing a medium-sized effect being reported by the models. Regression models (4-8) measuring the impact of risk factors on IPO performance after the initial day in subsequent periods show R^2 as 29.2% for Price after 1 Week (PA1W), 29.0% for Price after 2 Weeks (PA2W) respectively depicting that the ability of explaining the variance by independent variables are reducing in subsequent period as it reached up to 27.2% in Model 8.

Table-5.2 :ANOVA Statistics of Model 1 to Model 8

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.467	9	4.163	7.875	.000[a]
	Residual	63.963	121	.529		
	Total	101.430	130			
2	Regression	36.234	9	4.026	7.383	.000[a]
	Residual	65.982	121	.545		
	Total	102.216	130			
3	Regression	36.171	9	4.019	7.070	.000[a]
	Residual	68.783	121	.568		
	Total	104.954	130			
4	Regression	40.964	9	4.552	5.546	.000[a]
	Residual	99.304	121	.821		
	Total	140.268	130			
5	Regression	40.659	9	4.518	5.488	.000[a]
	Residual	99.609	121	.823		
	Total	140.268	130			
6	Regression	38.914	9	4.324	5.266	.000[a]
	Residual	99.345	121	.821		
	Total	138.259	130			
7	Regression	37.176	9	4.131	5.039	.000[a]
	Residual	99.181	121	.820		
	Total	136.357	130			
8	Regression	40.811	10	4.081	4.754	.000[a]
	Residual	103.010	120	.858		
	Total	143.821	130			

The ANOVA table-5.2 values show that we have a significant linear regression and the models as a whole are significant at predicting dependent variables, namely Issue Price: F (9, 121) = 7.875, p < .001; Listing Day Opening Price: F (9, 121) = 7.383, p

< .001 and Listing Day Closing Price: F (9, 121) = 7.070, p <.001. All other models also have *p* values less than .001, proving that the variance in all the dependent variables is accounted for by the linear combination of the predictor variables (Constant, LnPrchgsensx, LnFirmAge, LnIssueSize, F6, F5, F4, F3, F2 and F1). The F-ratio represents an improvement in the prediction of the variable by fitting the model after considering the inaccuracy present in the model. The test statistic's F-value is the result of a one-way ANOVA.

Table-5.2 also reflects that all the regression models have p< .001, showing sufficient evidence to conclude that the regression model fits the data better than the intercept-only model and all of the predictor variables are jointly significant. Hence, the regression effect is statistically significant; indicating that prediction of the dependent variable is accomplished better than can be done by chance.

5.2.5 Analysis of formulated hypotheses: In this section, the hypotheses are analysed and discussed.

5.2.5(i) The impact of Risk Factor Categories on Issue Price

The issue price is the price at which the initial public offering (IPO) is first made available to the general public. In compliance with the Book Building Process and the Red Herring Prospectus, this price is determined and set in consultation with the offering's Lead Managers and Underwriters. In general, an underwriter takes into account a variety of variables that may affect the IPO price. An underwriter, for example, evaluates a company's present worth as well as its potential prospects. In addition, the IPO price takes into account the investment and industry risk profile and compensates investors for it. Finally, the IPO price takes into account the supply and demand forces prevailing in the market. So an underwriter tries to balance the IPO price in a way that is high enough to raise sufficient capital for a company while being low enough to stimulate the interest of potential investors in purchasing the shares. Maintaining the balance is critical to ensure the execution of a successful IPO. The risk factors have an impact on the issue / offer prices, and the offer price further has an impact on the market performance of IPOs, which is also a key component of determining the under-pricing. So, to analyse the impact, the following hypothesis is formulated:

H_{01}: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Issue Price.

H_{11}: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Issue Price.

Further, to test the first hypothesis, the following ordinary least squares regression equation is formed for Model 1:

ISSP = α + β (1) FAGE + β (2) ISSIZE + β (3) PRCHGSENSX + β (4) OPRRISK + β (5) COMPRISK + β (6) MNGRRISK+ β (7) EQRISK + β (8) FINRISK + β (9) TECHCMPRISK + ε ……..(i)

While examining the impact of risk variables on the Issue Price by category (each regression coefficient), the null and alternative hypotheses for each parameter must be analysed. The unstandardized and standardised regression coefficients (β) should be looked at. The effect of a 1-unit increase in the predictor on the dependent variable is represented by the unstandardized beta (β). It shows how a single predictor and the dependent variable have a partial relationship. If there are multiple independent variables in the regression equation, each unstandardized beta coefficient indicates the consequence of raising the independent variable by one unit while maintaining the other predictors constant.

Table-5.3: Regression Coefficients (Dependent Variable: LnIssuePrice)

	Unstandardized Coefficients		Standardized Coefficients		
Model 1	B	Std. Error	Beta	t	Sig.
(Constant)	**2.628*** **	.649		4.053	.000
LnIssueSize	**.441*** **	.063	.539	7.047	.000
LnAge	**.201** **	.079	.189	2.528	.013
LnPrchgsesx	-.096	.200	-.036	-.480	.632
F1	.051	.064	.057	.786	.434
F2	-.032	.066	-.036	-.485	.629
F3	-.033	.065	-.038	-.509	.612
F4	-.020	.065	-.023	-.305	.761
F5	-.089	.065	-.101	-1.363	.176
F6	**.161** **	.065	.182	2.490	.014

***Indicates significance at 1% level, **indicates significance at 5% level and *indicates significance at 10% level

Model 1 shows the effect of risk factors on the IPO Issue Price. Overall, the model is statistically significant at the 1% level.Table-5.1 reflects R^2 as.369 and adjusted

R^2 value as.322, showing that 32% of the variation in issue price can be explained by differences in dependent variables. It can be noticed from the table-5.3 that the control variable-IPO Issue Size has a significant positive effect on the Issue Price at 1% level of significance ($p < .001$). Firm age is another control variable that has a significant impact at the 5% level of significance (p.05). However; there is no evidence that the third control variable (Percentage change in Market Sensex) is related to the issue price. The risk factor categories have shown limited effect. The null hypothesis is accepted for the majority of risk categories (F1, F2, F3, F4, F5), indicating that there is no significant relationship between the extent of risk factor disclosure in different risk categories and issue price, but it is rejected for risk category F6 (p.05) at a 5% level of significance. Hence, individually, 'Technological and Competitive Risk Factors' have a significant impact on the IPO Issue Price. The following regression equation has been developed to predict the impact of risk factors on IPO issue price:

Ln (ISSP) = 2.628 + .201 Ln (FAGE) + .441 Ln (ISSIZE) - .096 Ln (PRCHGSENSX) - .051 (OPRRISK) -.032 (COMPRISK) -.033 (MNGRRISK)-.020 (EQRISK) -.089 (FINRISK) + .161 (TECHCMPRISK)

5.2.5(ii) The Impact of Risk Factor Categories on Listing Day Opening Price

Listing day Opening price is the price at which any IPO stock is listed on the stock exchange on its initial day. It is called the listing price or opening price. To measure the impact of the risk factor on the opening price, the following hypothesis is formulated:

$H0_2$: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Listing Day Opening Price.

$H1_2$: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Listing Day Opening Price.

The summary statistics shown in table-5.1 prove that overall regression fits for Model 2 and significantly explains the impact of variations in predicators on Listing Day Opening Price, i.e., 30.6 % variations.

The table-5.4 highlights that the same control variables, i.e., Issue Size ($p< .001$) and Firm Age ($p<.10$) which were significantly related to Issue Price (as shown in Model 1), are also showing a significant positive impact on the Opening Price. The alternate

hypothesis is accepted due to the Technological and Competitive Risk Factors Category (F6), rejecting the null hypothesis (p.01) at a 1% level of significance. The other risk factor categories (F1, F2, F3, F4 and F5) proved to have no impact on the Listing Day Opening Price of IPOs and resulted in the following regression equation:

Ln (LDOP) = 2.630+.158 Ln (FAGE) +.425 Lm (ISSIZE) +.039 Ln (PRCHGSENSX) +.079 (OPRRISK) -.007 (COM0PRISK) -.029 (MNGRRISK) -.027 (EQRISK) -.083 (FINRISK) +.183 (TECHCMPRISK)

Table -5.4: Regression Coefficients (Dependent Variable: LnOpeningPrice)

	Unstandardized Coefficients		Standardized Coefficients		
Model 2	B	Std. Error	Beta	t	Sig.
(Constant)	**2.630*** **	.659		3.992	.000
LnIssueSize	**.425*** **	.063	.518	6.693	.000
LnAge	**.158***	.081	.148	1.954	.053
LnPrchgsesx	.039	.203	.015	.195	.846
F1	.079	.065	.089	1.208	.229
F2	-.007	.067	-.008	-.104	.918
F3	-.029	.066	-.032	-.433	.666
F4	-.027	.066	-.030	-.406	.685
F5	-.083	.066	-.094	-1.261	.210
F6	**.183*** **	.066	.206	2.781	.006

***Indicates significance at 1% level, **indicates significance at 5% level and *indicates significance at 10% level

5.2.5(iii) The Impact of Risk Factor Categories on Listing Day Closing Price

Closing Price is the price at which the IPO closes its trading on its first listing day. There may be fluctuations in the price during the whole day, but trading stops at this price. This is the price which is used relatively to Issue Price for calculating the under-pricing or over-pricing on the initial day. This price has a significant impact on the performance of the IPO. For investigating the impact of risk factors in the prospectus on Listing Day Closing Price (market performance), the following OLS Regression equation is formulated:

LDCP= α + β (1) FAGE + β (2) ISSIZE + β (3) PRCHGSENSX + β (4) OPRRISK + β (5) COMPRISK + β (6) MNGRRISK+ β (7) EQRISK + β (8) FINRISK + β (9) TECHCMPRISK + ε

To test this equation the null hypothesis is assumed as:

$H0_3$: There is no significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Listing Day Closing Price.

$H1_3$: There is a significant relationship between the extent of risk factors disclosure in different risk categories and the IPO Listing Day Closing Price.

Model 3 also uses the same predictors as used in the earlier models, but the dependent variable is the Listing Day Closing Price. The results are also the same but produce different regression coefficients.

Table-5.5:Regression Coefficients (Dependent variable-LnClosingPrice)

	Unstandardized Coefficients		Standardized Coefficients		
Model 3	B	Std. Error	Beta	t	Sig.
(Constant)	**2.648*** **	.673		3.937	.000
LnIssueSize	**.424*** **	.065	.509	6.537	.000
LnFAge	**.157***	.082	.146	1.908	.059
LnPrchgsesx	.038	.207	.014	.186	.853
F1	.077	.067	.086	1.158	.249
F2	-.006	.069	-.006	-.082	.935
F3	-.024	.068	-.026	-.348	.728
F4	-.024	.068	-.027	-.359	.720
F5	-.080	.068	-.089	-1.186	.238
F6	**.188*** **	.067	.209	2.798	.006

***Indicates significance at 1% level, **indicates at 5% level and *indicates significance at 10% level

The results shown in table-5.5 indicate that Issue Size ($p< .001$), Firm Age ($p< .10$) and Technological and Competitive Risk Factors Category ($p< .01$) are significantly positively related to the Listing Day Closing price. All the risk factors together have a significant impact on the Listing Day Closing price. But individually, all other risk factor categories, except the F6 risk category, have no impact on the dependent variable. The coefficient tells us that a one percent increase in Technological and Competitive risk factors leads, on average, to a.185 percent (Unstandarised Coefficient) increase in Listing Day Closing Price. The standarised coefficient reports that a single standardised deviation increase in Technological and Competitive Risk Factors effects a.188% increase in the Closing Price. Here the null hypothesis is

rejected for the Technological and Competitive Risk Factor category. Total risk factors are not significantly related to the Listing Day Closing Price.

5.2.5(iv) The Impact of Risk Factor Categories on Subsequent Stock Prices

For investigating the impact of risk factor categories on subsequent stock prices, the following hypotheses are assumed:

$H1_4$: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO Price after 1 Week (PA1W).

$H1_5$: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after 2 weeks (PA2W).

$H1_6$: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after 3 weeks (PA3W).

$H1_7$: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price after 1 month (PA1M).

$H1_8$: There is a significant relationship between the extent of risk factor disclosure in different risk categories and the IPO stock price 3 months (PA3M)

Models 4 through 8 examine the impact of risk factor categories on subsequent stock prices, i.e., stock prices after one week, two weeks, three weeks, one month, and three months. Two control variables, namely Issue Size and Firm Age are the same as used in previous models. But the third control variable-'Percentage Change in Market Sensex' changes according to the spread of time. Model 4 to 8 uses it as a percentage change in the market sensex from the date of the issue of the IPO to one week after the issue trading date, two weeks after the issue trading date, three weeks after the issue trading date, one month after the issue trading date and three months after the issue trading date, respectively. All these regression models are overall significant in predicting the impact of risk factors on their respective dependent variables. The adjusted R square values (table-5.1) show that more than 21% variation is being explained by these models.

Table-5.6 shows a significant positive relationship between Issue Size and subsequent Stock Prices at a 1% level of significance. No evidence of a relationship between the Percentage Change in Market Sensex and subsequent Stock Prices up to 1 month was noticed, but surprisingly, this Percentage Change in the Market Sensex showed a positive impact on Stock Prices after three months (PA3M) at a 5% level of significance. Firm age has also shown no relationship with stock prices taken as

dependent variables. Analysing the impact of each risk factor category individually on subsequent stock prices, it was noticed that only one 'Technological and Competitive Risk Factor Category' had a significant positive relationship with each subsequent stock price after one week, after two weeks, after three weeks, after one month and after three months, each at a 5% level of significance. Hence, the alternate hypothesis is accepted for this risk factor category. All other risk factor categories have shown no relationship with subsequent stock prices or performance.

Table-5.6: Regression Results of Subsequent Stock Prices with Risk Categories

	Model 4		Model 5		Model 6		Model 7		Model 8	
Variables	B	Sig.	B	Sig..	B	Sig.	B	Sig.	B	Sig.
1 (Constant)	**1.878***	.086	**2.126****	.053	**2.254****	.037	**2.456****	.019	.792	.425
LnIssueSize	**.482*****	.000	**.481*****	.000	**.470****	.000	**.458*****	.000	**.429*****	.000
LnAge	.051	.607	.051	.608	.058	.556	.062	.528	.097	.340
F1	.079	.328	.081	.317	.077	.341	.076	.344	.081	.327
F2	-.097	.242	-.095	.253	-.091	.271	-.093	.261	-.122	.151
F3	-.041	.607	-.042	.604	-.047	.559	-.047	.553	-.042	.608
F4	-.073	.369	-.072	.378	-.074	.368	-.071	.383	-.057	.499
F5	-.058	.485	-.062	.448	-.067	.410	-.070	.394	-.054	.524
F6	**.174****	.030	**.174****	.031	**.167****	.037	**.166****	.039	**.171****	.042
LnPrcsensx 1w/2w/3w/ 1m/3m	.223	.413	.147	.582	.128	.621	.086	.731	**.596*****	.010

Model4 a. Predictors: (Constant), LnPrcsensx1w, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6, Model5 a. Predictors: (Constant), LnPrcswnsx2w, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6, Model6 a. Predictors: (Constant), LnPrcsensx3w, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6, Model7 a. Predictors: (Constant), LnPrcsensx1m, LnFirmAge, LnIssueSize, F1, F3, F2, F4, F5, F6, Model8 a. Predictors: (Constant), LnPrcsensx3m, LnFirmAge, LnIssueSize F1, F3, F2, F4, F5, F6, **Dependent Variables**-, Model4 LnPA1W, Model5 LnPA2W, Model6 LnPA3W, Model7 LnPA1M, Model8 LnPA3M

***Indicates significance at 1% level, **indicates at 5% level and *indicates significance at 10% level.

5.3 THE IMPACT RISK CATEGORIES ON THE LEVEL OF UNDER-PRICING

In the short run, the market performance of an IPO is measured by the extent of under-pricing on the first day of listing and the post-listing days. Further, initial day returns are classified under the two market scenarios as primary market under-pricing and secondary market under-pricing. The returns calculated in the present study are raw returns on the listing day as Under-pricing in the primary market and Under-

pricing in the secondary market, and further post listing day returns as Under-pricing after 1 week, Under-pricing after 2 weeks, Under-pricing after 3 weeks, Under-pricing after 1 month and Under-pricing after 3 months. To investigate whether the Indian IPOs were under-priced, the market performance in the short run was examined using first-day primary market i.e. opening price performance as well as secondary market i.e. first day closing price performance and post-day subsequent returns through different regression models. The above mentioned extents of Under-pricing are used as dependent variables in the different regression models used in the present study. Mutually exclusive identified risk categories are used as explanatory variables along with control variables. The control variables which are regressed in the present study are Issue Size, Firm Age, and Percentage Change in Market Sensex (representing market behaviour during exactly the same time span as used in the concerned dependent variable). The impact of risk factors on IPO under-pricing with different time span is discussed in the following sections.

5.3.1 Descriptive Statistics

Table-5.7 presents the descriptive statistics of 131 observations. The extent of under-pricing in the primary market on the opening of the first day of listing ranges between-1.00 to 1.42, while it ranges between-21.56 % to 143.06 % among the 131 firms on the closing of the first day of listing. The minimum issue size is Rs 23 crores (Xelpmoc Design and Tech Limited in 2015), while the maximum issue size was Rs 11175.84 crores for the General Insurance Corporation of India IPO in 2017. The total number of risk factors disclosed remained between 30 and 67, with an average of 51 risk factor statements in numbers. Category-wise risk disclosure reported by Indian firms is as- On average, Operating Risks (F1) range from 3 to 23, Compliance Risks (F2) range from 1 to 10, Management Risks (F3) range from 1 to 10, Financial Risks (F5) range from 4 to 20, and Technological and Competitive Risks (F6) range from 1 to 7 risk statements. The level of under-pricing, i.e. the average difference in IPO price at the beginning of the first day of trading from the issue day, is noticed as 0.13%, while at the end of the first day of trading it is recorded as 15.96% and it was 24.32% after three months, on an average basis. This amount of under-pricing was likewise at an all-time high after three months, measuring 207.94 percent, and at an all-time low, measuring -63.39 percent.

Table-5.7: Descriptive Statistics of Under-pricing Measurement Variables

N= 131	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Dev.	Skewness Statistic
First listing day returns					
Primary Market- UPPRIM *(the period from the issuing day to the beginning of the first listing day)*	-1.00	1.42	.133	.315	.905
Secondary Market- UPsec *(the period from the issuing day to the end of the first listing day)*	-21.56	143.06	15.96	29.87	2.03
Post-day market returns (*the after-listing period from day 2 to 3 months)*					
UP1W	-33.75	143.48	15.23	30.60	1.63
UP2W	-38.55	198.19	16.44	35.04	2.24
UP3W	-27.29	175.47	17.21	35.09	1.96
UP1M	-31.56	182.41	15.91	34.14	2.02
UP3M	-63.39	207.94	24.32	46.49	1.34
Predictors					
Issue Size (Amount in Cr)	23.00	11175.84	1125.29	1680.46	3.81
LnIssueSize	3.14	9.32	6.43	1.08	-.095
Firm Age (in complete years)	1.00	98.00	20.40	17.27	2.26
LnFirmAge	.00	4.58	2.71	.83	-.53
Prcopsensx	-12.26	10.17	-.19	2.82	-.68
Prchsensx	-11.18	8.84	-.24	2.78	-.67
Prchsensx1w	-25.53	10.24	-.33	3.36	-3.13
Prchsensx2w	-26.67	10.02	-.16	3.73	-2.59
Prchsensx3w	-26.61	11.06	-.15	3.99	-2.31
Prchsensx1m	-33.35	179.18	15.73	33.72	1.97
Prchsensx3m	-77.50	214.75	25.94	48.21	1.28
Operating Risks (No. of Statements)	3.00	23.00	10.46	4.01	.29
Compliance Risks (-do-)	1.00	10.00	5.59	1.93	.003
Managerial Risks (-do-)	1.00	12.00	6.51	2.18	.087
Equity Risks (-do-)	7.00	25.00	13.28	3.34	.56
Financial Risks (-do-)	4.00	20.00	11.31	3.17	.48
Technological & Competitive Risk (-do-)	1.00	7.00	3.54	1.57	.196
F1	-1.76	2.11	.0000	1.00	.090
F2	-1.84	3.32	.0000	1.00	.827
F3	-2.67	2.62	.0000	1.00	.059
F4	-1.91	3.23	.0000	1.00	.714
F5	-2.28	2.64	.0000	1.00	.623
F6	-2.28	2.20	.0000	1.00	-.110

[Here in Table-5.7: N -Sample size, **UPPRIM** - Under-pricing in Primary Market (Raw return), **UP-** Under-pricing in Secondary Market (Raw Return) **UP1W** - Under-pricing after 1 week from the listing of IPO, **UP2W** - Under-pricing after 2 weeks from the listing of IPO, **UP3W** - Under-pricing after 3 weeks from the listing of IPO, **UP1M** = Under-pricing after 1 month from the listing of IPO, **UP3M** - Under-pricing after 3 months from the listing of IPO, **LnIssueSize-** Natural logarithm of Issue Size, **LnFirmAge -** Natural logarithm of Firm Age, **Prcopsensx-** Percentage Change in Listing day Opening Market Sensex from IPO issue day Market Sensex, **Prchsensx-** Percentage Change in Listing day Closing Market Sensex from IPO issue day Market Sensex, **Prchsensx1w-** Percentage Change in Market Sensex after 1 week from IPO issue day Market Sensex, **Prchsensx2w-** Percentage Change in Market Sensex after 2 weeks from IPO issue day Market Sensex, **Prchsensx3w-** Percentage Change in Market Sensex after 3 weeks from IPO issue day Market Sensex, **Prchsensx1m-** Percentage Change in Market Sensex after 1 month from IPO issue day Market Sensex, **Prchsensx3m-** Percentage Change in Market Sensex after 3 months from IPO issue day Market Sensex. **F1** –Mutually Exclusive Identified Operating Risk Category, **F2-** Mutually Exclusive Identified Compliance Risk Category, **F3** Mutually Exclusive Identified Managerial Risk Category, **F4** - Mutually Exclusive Identified Equity Risk Category, **F5-** Mutually Exclusive Identified Financial Risk Category, and **F6** - Mutually Exclusive Identified Technological & Competitive Risk Category.]

Fig. 5.4 depicts the magnitude of under-pricing on the first day as well as in succeeding weeks and months.

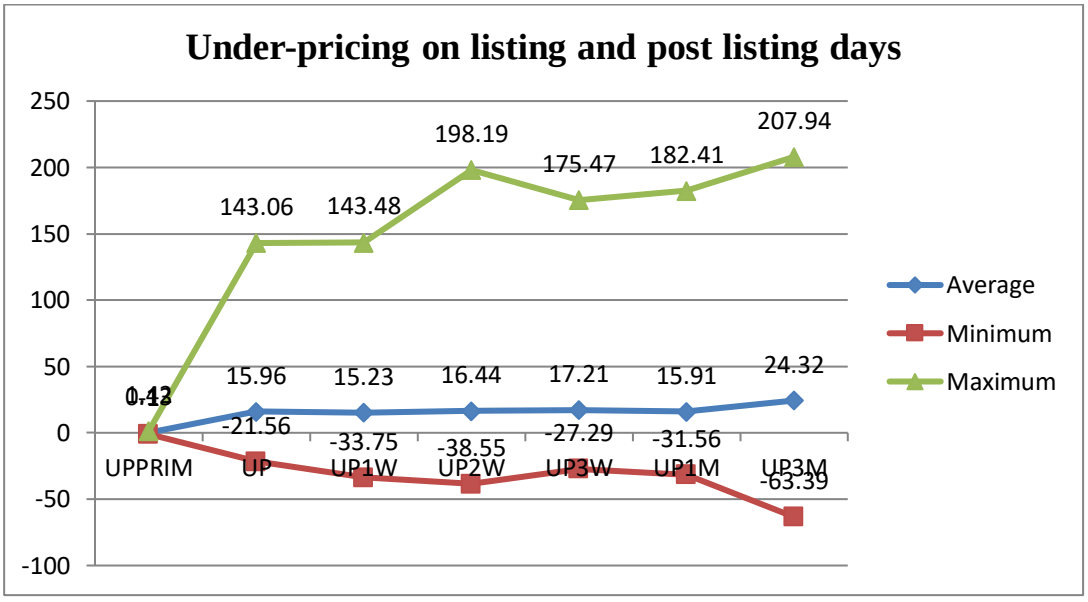

Figure 5.4: Under-pricing on listing and post-listing days

(Source: Author's own compilation)

The percentage change in the market sensex from the issue day to the day of the opening day of listing remained negative 0.19% on an average basis in the primary market, while in the initial day secondary market it was negative 0.24%. Fig 5.5 shows the extent of Percentage Change in Stock Prices and Market Sensex ranging from the listing day to three months from the day of listing on an average basis.

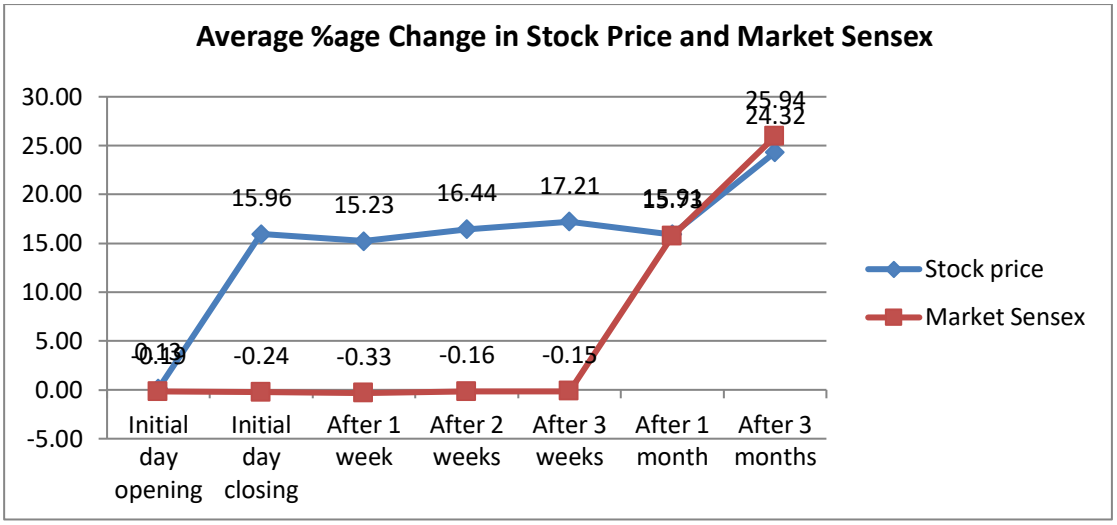

Figure- 5.5: Average Percentage Change in Stock Prices and Market Sensex

(Source: Own compilation)

5.3.2 Multiple Regression Model for the Primary Market

In the primary market multiple regression model, the primary market initial return/under-pricing is calculated for the period from the issuing day of the IPO to the opening of the first day of listing after considering the listing-day opening price and the issue price. The percentage difference between the issue price of the issued IPO and the opening price of the IPO on the first trading day is considered as the dependent variable in this primary market regression model. Risk factor categories are used as explanatory variables along with control variables. To investigate the impact of risk factors on listing day opening returns/under-pricing in the primary market which is considered as primary market performance, the following OLS Regression equation is formulated:

$$UPPRIM = \alpha + \beta(1)\,ISSIZE + \beta(2)\,FAGE + \beta(3)\,PRCHOPSNSX + \beta(4)\,OPRRISK + \beta(5)\,COMPRISK + \beta(6)\,MGTRISK + \beta(7)\,EQRISK + \beta(8)\,FINRISK + \beta(9)\,TECHCMPRISK + \varepsilon \quad \ldots\ldots\ldots (ix)$$

The mutually exclusive risk factor categories identified through Factor Analysis, namely F1 – Operational Risk (OPRRISK), F2-Compliance Risk (COMPRISK), F3-Management Risk (MGTRISK), F4-Equity Risk (EQRISK), F5-Financial Risk (FINRISK), and F6-Technological and Competitive Risk (TECHCMPRISK), are the independent variables here, along with control variables, namely Issue Size

(ISSSIZE), Firm Age (FAGE) and Percentage Change in Listing day Opening Market Sensex from IPO issue day market sensex (PRCHOPSENSX).

Hypothesis:

The following hypotheses are assumed for this regression model:

H_{09}: The extent of risk factor disclosure in different risk categories has no significant impact on the IPO initial under-pricing in the primary market.

H_{19}: The extent of risk factor disclosure in different risk categories has a significant impact on the IPO's initial under-pricing in the primary market.

Table-5.8: Correlation Matrix of Explanatory Variables of Model 9

Variables	UPPRIM	LnIssue Size	LnFirm Age	Prcop-sensx	F1	F2	F3	F4	F5	F6	VIF
UPPRIM	1.000										
LnIssueSize	-.072	1.000									1.14
LnFirmAge	-.184	.117	1.000								1.08
Prcopsensx	.276	.116	.069	1.000							1.06
F1	.181	-.024	-.093	-.095	1.000						1.02
F2	-.019	.195	.182	.001	.000	1.000					1.08
F3	-.005	-.063	.012	-.145	.000	.000	1.000				1.03
F4	.030	-.159	-.140	-.008	.000	.000	.000	1.000			1.05
F5	-.013	.193	.055	-.028	.000	.000	.000	.000	1.000		1.05
F6	.080	.009	.007	.107	.000	.000	.000	.000	.000	1.00	1.01

The table-5.8 shows the correlation matrix between the variables which indicates the absence of multicollinearity as all the correlation coefficients are less than 0.05 and there is no correlation among the risk factor categories (F1, F2, F3, F4, F5 and F6). Moreover all the VIF values are also less than 10 proving that there is no issue of multicollinearity in the data. While Durbin–Watson test statistic 1.821 indicates non-existence of autocorrelation in residuals.

The ANOVA statistics mentioned in table-5.9 show that the model as a whole is significant for predicting the level of initial day under-pricing in the primary market: $F(9, 121) = 2.672$ and p is .007< .01. The R^2 value represents the proportion of the variance in the dependent variable that can be explained by the estimated multiple regression equation; it also signifies the degree of goodness of fit of the estimated multiple regression equation. The Adjusted R^2 avoids the overestimating error in measuring the impact of adding an independent variable on the amount of variance being explained by the regression equation. The R^2 value of 0.166 and adjusted R^2 of

0.104 reports that at least 10.4% of the variability in listing day opening under-pricing can be explained by a linear combination of predicators. Although the strength of Model 9 is low, the model is significant at a 1% level of significance.

Table -5.9: OLS Regression of Under-pricing in Primary Market with Risk Categories

Model 1	Unstandarised Coefficient	Standardised Coefficient	t	Sig.	R- square .166
(Constant)	**.505*** **		2.710	.008	
LnIssueSize	-.027	-.093	1.054	.294	
LnFirmAge	**-.070** **	**-.186** **	2.166	.032	Adjusted R^2 .104
Prcopsensx	**.036*** **	**.318*** **	3.720	.000	
F1	**.060** **	**.191** **	2.286	.024	
F2	.010	.033	.382	.703	F 2.672
F3	.012	.037	.442	.660	
F4	-.003	-.009	-.101	.920	
F5	.007	.024	.279	.781	Model Sig. .007[a]
F6	.015	.047	.568	.571	

a. Predictors: (Constant), F6, F5, F4, F3, F2, F1, Prcopsensx, LnFirmAge, LnIssueSize,

b. Dependent Variable: UPPRIM

***Indicates significance at 1% level, **indicates at 5% level and *indicates significance at 10% level**

Looking at the results, it can be noticed that only Operating Risk Category (F1) is significantly positively associated with the degree of under-pricing in the primary market at a 5% level of significance, while the other risk categories have no significant association with under-pricing. The null hypothesis is rejected for this F1 risk category. The regression coefficient indicates that one percent increase in Operating Risk Factors leads, on average, to 6.0 % increase in the degree of under-pricing. Change in Market Sensex on the opening of listing day from IPO issue day has also significant positive impact on the extent of under-pricing at 1% level of significance. Issue Size has an insignificant relation while firm age has negative association with the initial day opening under-pricing.

5.3.3 Multiple Regression Model for the Initial Day Secondary Market

In this initial day secondary market regression model, the secondary market initial return/under-pricing is calculated for the period from the issuing day of the IPO to the end of the first day of listing after considering the listing-day closing price and the

issue price. Immediately after listing the security at the opening of the first trading day, the security is traded in the secondary market; hence it is treated as the initial day's secondary market performance. The percentage difference between the issue price of the issued IPO and the closing price of the IPO on the first trading day is known as "initial day under-pricing" in the secondary market. This extent of under-pricing is considered as a dependent variable in the Regression Model 10. Risk factor categories and control variables, as mentioned earlier, are used as explanatory variables in the regression equation. But 'Percentage Change in Market Sensex' (PRCHSENSX) is calculated as Percentage Change in Market Sensex at the end of the first day of trading from the market Sensex on the IPO issue day. To investigate the impact of risk factors on listing day closing returns/under-pricing in the initial day secondary market, the following OLS Regression equation is used:

$UP_{sec} = \alpha + \beta\ (1)\ ISSIZE + \beta\ (2)\ FAGE + \beta\ (3)\ PRCHSENSX + \beta\ (4)\ OPRRISK + \beta\ (5)\ COMPRISK + \beta\ (6)\ MGTRISK + \beta\ (7)\ EQRISK + \beta\ (8)\ FINRISK + \beta\ (9)\ TECHCMPRISK + \varepsilon$ ……..…. (x)

Hypotheses:

The following hypotheses are assumed for this regression model:

$H0_{10:}$ The extent of risk factor disclosure in different risk categories has no significant impact on the IPO's initial under-pricing in the secondary market.

$H1_{10}$: The extent of risk factor disclosure in different risk categories has a significant impact on the IPO's initial under-pricing in the secondary market.

The Correlation Matrix and Model Summary of Model 10

The table-5.10 shows that all the correlation coefficients between the variables are less than 0.256, which indicates there is no multicollinearity among the variables. Moreover, all the VIF values are also less than 10, proving that there is no issue of collinearity in the independent variables, and the Durbin–Watson test statistic is 1.897, indicating no major issue of autocorrelation in residuals. The R^2 for the model is 0.128 and adjusted R^2 of 0.063, which shows that as a whole, the model can explain the 12.8% variability in the initial day under-pricing in the secondary market through the explanatory variables, and the overall model has F (9, 121) = 1.977, which is significant at the 5% level of significance (see table 5.10).

Table-5.10: Correlations Matrix and Model Summary-Initial Under-pricing in Secondary Market (Model 10)

Variables	UP_{sec}	LnIssue Size	LnFirm Age	F1	F2	F3	F4	F5	F6	PRCH-SENSX	VIF
UP_{sec}	1.000										
LnIssueSize	-.101	1.000									1.121
LnFirmAge	-.103	.081	1.000								1.074
F1	.127	-.024	.042	1.00							1.011
F2	.070	.195	.170	.000	1.000						1.073
F3	.008	-.063	.042	.000	.000	1.000					1.019
F4	.017	-.159	-.043	.000	.000	.000	1.00				1.030
F5	-.008	.193	.167	.000	.000	.000	.000	1.000			1.074
F6	.117	.009	-.078	.000	.000	.000	.000	.000	1.00		1.036
PRCH-SENSX	.256	.055	-.044	-.092	.009	-.112	-.014	-.049	.168	1.00	1.058

Durbin-Watson	**R =**	**R-Square**	**Adjusted R^2**	**S.E. E.**	**N =**
1.897	358	.128	.063	25.9599	131

	Sum of Squares	**df**	**F**	**Sig.**
ANOVA[b] Statistics	Regression- 14925.863 Residual- 101479.475 Total- 116405. 338	(9. 121)	1.977	048

The hypothesis is tested on the basis of the OLS regression results mentioned in table 5.11. At a 5% significance level, beta estimates indicate that the F1-Operating Risk and F2-Compliance Risk categories have a significant positive impact on the initial day's under-pricing. It implies that if all other factors in the model remain constant, we can predict an increase of 4.58 percent and 3.18 percent in the extent of under-pricing for every 1 percent rise in Operating Risk Factor and Compliance Risk Disclosure, respectively. Other risk categories show no significant relationship with the extent of under-pricing. The control variables - Percentage Change in the Market Sensex has a significant impact on the extent of under-pricing at a 1% level of significance (p =.003) while Firm Age shows negative impact on this degree of under-pricing in secondary market on the listing day at 5% level of significance. As a result of the F1 and F2 risk categories, the null hypothesis is rejected, demonstrating that the level of risk factor disclosure in different risk categories has a significant impact on the IPO's initial under-pricing.

The level of under-pricing on the closing of first listing day can be estimated through the following Regression equation:

UP_{sec} = 51.270 – 3.70 Ln(ISUSIZE) -4.010 Ln(FAGE) + 2.873 (PRCHSENSX) + 4.583 (OPRRISK) + 3.374(COMPRISK) + 1.032 (MNGRRISK) -.159 (EQRISK) + 1.491 (FINRISK) + 1.932 (TECHCMPRISK)

Table-5.11: OLS Regression Results of Model 10

Predictors	Unstandarised Coefficient	Standarised Coefficient	t	Sig.
(Constant)	**51.270*** **		2.812	.006
LnIssueSize	-3.700	-.134	-1.486	.140
LnFirmAge	**-4.010** **	**-.112** **	-1.269	.027
F1(OPRRISK)	**4.585** **	**.158** **	1.994	.045
F2(COMPRISK)	**3.183** **	**.164** **	2.568	.020
F3 (MANRRISK)	1.032	.035	.403	.688
F4(EQRISK)	-.134	-.005	-.062	.951
F5(FINRISK)	1.491	.050	.566	.572
F6(TECHCMPRISK)	1.932	.065	.747	.456
PRCHSENSX	**2.873*** **	**.267*** **	3.060	.003

Predictors: (Constant), LnIssueSize, LnFirmAge, Prchsensx, F1,F2,F3,F4,F5,F6, , Dependent Variable: UP_{sec}

***Indicates significance at 1% level, **indicates at 5% level and *indicates significance at 10% level

5.3.4 Impact of Risk factor disclosure on post listing days/ subsequent under-pricing

In order to see the impact of risk factor disclosure on the under-pricing of stocks in following weeks, the following dependent variables are used in the Regression Models (11-15)

Model 11- Under-pricing after One Week (UP1W) - It is percent change in the stock price after one week of trading from stock issue price. It is calculated as:

UP1W= (Share Price 1 week after closing of first day of trading – Issue price)/Issue price

Model 12-Under-pricing after Two Weeks (UP2W) - It is percent change in the stock price after two week of trading from stock issue price. It is calculated as:

UP2W= (Share Price 2 weeks after closing of first day of trading – Issue price)/Issue price

Model 13- Under-pricing after Three Weeks (UP3W) - It is percent change in the stock price after three weeks of trading from stock issue price. It is calculated as:

UP3W= (Share Price 3 weeks after closing of first day of trading – Issue price)/Issue price

Model 14- Under-pricing after One Month (UP1M) - It is percent change in the stock price after one month of trading from stock issue price. It is calculated as:

UP1M= (Share Price 1 month after closing of first day of trading – Issue price)/Issue price

Model 15- Under-pricing after Three Months (UP3M) - It is percent change in the stock price after three months of trading from stock issue price. It is calculated as:

UP3M= (Share Price 3 months after closing of first day of trading – Issue price)/Issue price

Table-5.12: Model Summary-Under-pricing of stocks in post listing period

Model	R	R^2	Adjusted R^2	S.E. of Estimate	Change Statistics					Sig.
					R Square Change	F Change	df1	df2	Durbin-Watson	
11	.233[a]	.054	-.016	30.8446	.054	.774	9	121	1.848	.640#
12	.250[a]	.062	-.007	35.1635	.062	.895	9	121	1.807	.532#
13	.268[a]	.072	.003	35.0373	.072	1.042	9	121	1.866	.411#
14	.992[a]	.984	.983	4.46252	.984	831.995	9	121	2.219	.000
15	.992[a]	.983	.982	6.19353	.983	800.571	9	121	2.234	.000

Mode 11 a. Predictors: (Constant), Prcsensx1w, LnIssueSize, LnFirmAge, F1, F3, F2, F4, F5, F6, b. Dependent Variable: UP1W. Model 12 a. Predictors: (Constant), Prcswnsx2w, LnIssueSize, LnFirmAg , F1, F3, F2, F4, F5, F6, b. Dependent Variable: UP2W, Mode l3 a. Predictors: (Constant), Prcsensx3w, LnIssueSize, LnFirmAge, F1, F3, F2, F4, F5, F6, b. Dependent Variable: UP3W, Model 14 a. Predictors: (Constant), Prcsensx1m, LnIssueSize, LnFirmAge , F1, F3, F2, F4, F5, F6, b. Dependent Variable: UP1M, Model 15 a. Predictors: (Constant), Prcsensx3m, LnIssueSize, LnFirmAge, F1, F3, F2, F4, F5, F6, b. Dependent Variable: UP3M.

 # indicates Model 11 to Model 13 exhibits lack -of- fit.

Model summary statistics contained in Table-5.12 exhibit that regression Model 11 to Model 13 lacks the ability to describe adequately the functional relationship between the risk factor disclosures and Under-pricing after 1 Week (UP1W), Under-

pricing after 2 Weeks (UP2W) and Under-pricing after 3 weeks (UP3W) respectively. Surprisingly, risk factor disclosures start to show a significant relationship with stock under-pricing after one month onward. Model 14 and Model 15 are statistically significant as they show their F statistics: F (9, 121) = 831.995, p <.001, and F (9, 121) = 800.541, p < .001, showing that these models are statistically good at estimating the influence of predicators on the extent of under-pricing after 1 month and after 3 months, respectively. The R-squared values of Model 14 and Model 15 show that the more than 98% variance in under-pricing after one month as well as after three months can be explained by the linear combination of the respective predictor variables.

Table-5.13: Regression Coefficients (Dependent Variable-UP1M and UP3M

	Model 14			Model 15		
	B	S.E	Sig.	B	S.E	Sig.
(Constant)	1.375	2.813	.626	4.258	3.915	.279
F1	.241	.393	.541	-.052	.546	.924
F2	.287	.409	.485	.089	.564	.875
F3	.230	.392	.558	-.151	.545	.783
F4	-.435	.401	.280	.669	.557	.232
F5	.041	.401	.919	.809	.558	.150
F6	.175	.392	.655	**1.179****	.546	.033
LnIssueSize	-.226	.385	.557	-.701	.537	.194
LnFirmAge	.077	.489	.876	-.089	.675	.895
Prchsensx1m/3m	**1.004*****	.012	.000	**.957*****	.012	.000

(***Indicates significance at 1% level, **indicates significance at 5% level and *indicates significance at 10% level)

The regression results of Model 14, shown in table-5.13, clearly show that Issue Size, Firm Age, and none of the risk categories have any impact on the extent of under-pricing after one month. At a 1% level of significance, only one independent variable—the Percentage Change in Market Sensex after 1 month from the issue date of the IPO has a significant positive impact on the extent of under-pricing after one month (UP1M). At the 5% and 1% levels of significance, respectively, Technological & Competitive Risk Factors (F6) and Percentage Change in Market Sensex after 3 months from the IPO's issue date have a significant positive impact on the extent of under-pricing after three months (UP3M) as shown in Model 15. While other risk

categories, Issue Size and Firm Age are found to be insignificant in influencing the percentage change in stock price after 3 months from the issue price.

5.4 CONCLUDING REMARKS

While examining the impact of mutually exclusive risk categories on IPO performance, it was discovered that Technological and Competitive Risk Factors Category have a significant positive impact on components of under-pricing, namely IPO Issue Price, Listing Day Opening Price, and Listing Day Closing Price. In the short run, this risk category had the same favourable impact on eventual stock pricing. Operating Risk Category had a positive impact on the degree of initial day under-pricing in the primary market, while both Operating Risk Category and Compliance Risk Category had a positive influence on the degree of listing day under-pricing in the secondary market.