Long-Term Risk-Adjusted Performance of Indian IPOs

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Abstract

In this paper, we studied a variety of issues – especially long term performance - pertaining to 184 IPOs in India during April 2001 and March 2009. We found that there is, on the average only, significantly positive return on the listing-day and the day following that, which gets reversed – but not annulled - within ten days. When we group the firms into two groups based on whether they yielded positive or negative absolute return, many new insights are obtained. Not only does the 50%-plus day-0 average Ri for the former group is in sharp contrast with the -14% day-0 Ri for the latter, but we found that the positive group does not gain anything from an up-market preceding the IPO, whereas a down-market is a major cause for the poor listing-day performance of the negative group. Positive-group IPOs also experience significant intra-day volatility in the after-market up to thirty days and it is the reverse for the negative group; but, whereas the negative group's day-0 Ri is related to its post-IPO standard-deviation of returns in the after-market, they are unrelated for the positive group. Even the average holding-period return of the negative group (starting day-1, not day-0) becomes significant only after four years, while it is positive throughout for the positive group. Corresponding CARs - from day-1 onwards – continue to be positive for the positive group throughout and negative for the negative group up to two years, becoming statistically zero thereafter. Overall, in the long-run, however, a random IPO portfolio only yields a return equal to the market, if we ignore the day0 abnormal return. Unlike most other studies, we adjusted for risk of an IPO by taking its post-issue risk, assuming that the market had rationally anticipated how risky a share would be after the IPO. We measured risk by the CAPM-Beta, LPM (Lower Partial Moment)-Beta, Variance Ratio, and LPM_2 (LPM of Order 2)-Ratio. We measured abnormal return by CAR (Cumulative Abnormal Return), where AR (Abnormal Return) was determined in a variety of ways, using the above risk measures – not all of which have been traditionally used by other researchers – and different models like the Market Model, CAPM, and LPM-CAPM.

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Section I: Introduction

In this paper, we study the pre-IPO performance of the market, listing-date (day-0, as we call it) performance of IPOs, and post-IPO performance of IPOs in the short-run and in the long-run stretching as much as five years. For gauging the performance of the stock, we consider both its absolute or absolute return and its risk-adjusted or abnormal return (we refer to it as AR) vis-à-vis the market portfolio. We take a variety of measures of risk, all based on the posit-IPO return on the stocks: beta, LPM-beta, variance ratio (variance of stock divided by the variance of the market portfolio), and the LPM-2 ratio (LPM-2 of the stock divided by the LPM-2 of the market); as we would explain later, LPM-2 (Lower Partial Moment of 2^{nd}-order) is a refined downside-risk measure ***similar*** to – though not the ***same*** as – semi-variance.

We also analyze other issues related to IPO: whether the issue size affects the day-0 absolute-return or the AR, whether issue-price affects the day-0 absolute return or AR, whether pre-IPO market return affects the day-0 absolute return and AR, whether day-0 absolute return or AR is related to the stock's post-IPO risk, whether AR changes or reverses after day-0, whether day-0 absolute return or AR makes up for any reversal in the short-run or the long-run, whether day-0 absolute return or AR has varied across the years, and whether day-0 absolute return or AR has fallen after the meltdown. We also break the firms into two groups based on the magnitude of day-0 absolute return or AR and analyze whether there is significant difference between the means of the two groups in terms of day-0 absolute return and AR. We also analyze whether only a few firms explain the significant day-0 absolute return and AR and whether sector returns explain in anyway day-0 absolute return or AR and post-IPO performance. The absolute return and AR stated above are all averaged across the firms in the full sample or a particular group. Our full sample consists of 184 IPOs (Initial Public Offerings) registered with the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE) during 1 April 2001 to 2 March 2009.

Brown and Warner (1985) was a classic paper that gave insights into how to conduct event studies, like ferreting out performance of a security following an event, say like its IPO. Many empirical studies in the past have reported significant day-0 ARs by IPOs. McDonald and

Fisher (1972) report an AR of 28.5% for 142 IPOs in 1969. Ibbotson (1975) finds risk-adjusted AR of IPOs in 1960s to be 11.4%. With a larger sample and a different model, Ibbotson and Jaffe (1975) report day-0 AR of 16.8%. Ritter (1984), taking more than 5000 IPOs that came to market during 1960 and 1982, reports an 18.8% initial AR. Studies like those by Block and Stanley (1980), Brown (1970), Logue (1973a, 1973b), Neuberger and LaChapelle (1983), Reilley (1973, 1977), Reilley and Hatfield (1969), and Stoll and Curley (1970) focused on the profit potential for investors and concluded, as we would have guessed from the under-pricing phenomenon, that ARs offered by IPOs in the short run are significantly positive. However, capital markets were found to be generally efficient in the sense that the abnormal returns for the stocks vanished very fast in the post-IPO market.

Later studies by Beatty and Ritter (1986), Ritter (1984), and Rock (1986) showed how information asymmetry between informed and uninformed investors can explain IPO under-pricing: the under-pricing can thus be construed to be the additional compensation offered by the IPO market to attract uninformed investors to participate. But, some other studies (Benveniste and Spindt-1989, Ibbotson and Jaffe-1975, Koh and Walter-1989) seem to suggest that under-pricing is not required to attract uninformed investors: though issuers may even collectively realize that IPOs should be under-priced on the average, a specific issuer would not like to be the cat-beller.

Given the stupendous listing-day performance of IPOs, it has been natural to test how long the honeymoon lasted. Leleux (1993) analyzed the performance of equity IPOs during 48 months following their introduction on the Paris Secondary Market in post-1985 period and found that French IPO shares underperformed in the long run, results quite similar to that found in USA by Aggarwal and Rivoli (1990), Ritter (1991), and Loughran and Ritter (1993). An equally-weighted portfolio of IPO shares purchased at the beginning of the first complete month of secondary trade would have given a post-IPO CAR (cumulative AR, which is merely the sum of ARs over a period) of -11.2 % over three years, whereas Ritter (1991) had reported a corresponding figure of -29% for US IPOs over the same period; cross-sectional regressions highlighted that other factors like the age of the firm, the timing of the issue (pre- and post October 1987), and whether the market is hot and cold also played a role in the long-term performance of the shares. Jain and Kini (1994), based on a sample of 682 IPOs in US, found that there is no relation between the level of initial underpricing and post-IPO performance for

US IPOs. Gompers and Lerner (2003) examined the five-year post-IPO performance of 3661 US IPOs and discovered that ARs from a buy-and-hold strategy revealed underpricing, which, however, disappeared when CAR was considered; interestingly, over the entire period, IPOs returned as much as the market did.

Madhusoodanan and Thiripalraju (1997) is one of the earliest papers on Indian IPOs that looked at the determinants of IPO pricing. Nandha and Sawyer (2002) studied 381 Indian IPOs during 1994-1995; they found that initial returns averaged above 100%, though size was negatively related to underpricing. Ghosh (2005), using 1842 IPOs in India's Bombay Stock Exchange during 1993 and 2001, also found that large issue-sizes had les underpricing and that uncertainty played a role in underpricing. Agarwalla (2008) studied 110 Indian IPOs during 2002-2005 and found that the extent of oversubscription significantly affected the level of underpricing and the post-IPO returns. He found that the 180-day post-IPO period yielded a mean return of 17.36%. Based on an analysis of Indian IPOs in 2000-2006, Garg, Arora, and Singla (2008) found that " (a) there exists a significant level of underpricing in the short-run; (b) the IPOs are usually overpriced over long-period; (c) the opening price returns does not differ significantly from the closing price returns; (d) the level of underpricing does not differ much in the hot and cold IPO markets; and (e) the abnormal returns from the IPO underpricing differ significantly in the bearish and the bullish phases of the market." Janakiramanan (2008) studied medium-run performance 116 IPOs issued in India in 2000 and 2001 and concluded that they gave positive AR by the end of 60 days.

More recently, Pande and Vaidyanathan (2009) found that the demand generated for an issue during book building as well as the delay in listing positively affect day-0 absolute return and AR; like many other studies, they also found that Post-IPO performance during one month after the listing is negative. Mayur and Kumar (2009) compared the pre-IPO performance of Indian public firms to their post-IPO performance and discovered that the performance of Indian public firms worsened significantly after going public and, in particular, those with the lowest insider stake following the IPO had the greatest deterioration in their post-IPO performance. Acharya (2009) recently reported in the Business Line newspaper that a study conducted by the newspaper on 285 IPOs made between January 2002 and August 2009 found that only 85 of them offered a compound annual-return (from offer price till 17th September 2009) of 15% or more; interestingly. It found that, though 148 issues had negative returns, the ones that gave

positive returns gave very good returns. The report further highlighted that seven out of ten IPOs managed some gain on listing; more than 15% delivered 15% or more return on the listing date itself. Deb (2009) has more recently found, using a sample of IPOs during 2001 and 2009, that there is evidence of underpricing, but this vanishes within a month; he however has not studied long-run performance of the IPOs.

Section II: Data

The data for the study was obtained from the Prowess database of CMIE (Center for Monitoring Indian Economy). The data comprised of all IPOs that were listed either in NSE or in BSE during 9 April 2001 and 2 March 2009. Out of 298 equity offerings during this period that got listed in NSE or BSE, only 187 were IPOs, while the rest were seasoned or follow-on offering. Three of these 187 were dropped due to insufficient or proper data. The daily return for the 184 remaining shares from the listing date till 2 July 2009 were also taken from Prowess database; these are total return on the shares, including dividend-yield. Since the earliest listing-date and the latest listing-date in the trimmed sample of 183 were, respectively, 11 April 2001(except for the one in 200) and 27 August 2008, we had at least 200 days and at most 1749 days of post-IPO daily return on all the shares. Similarly, the BSE Sensex total daily return, which also includes dividend yield on this market portfolio, were taken for the full sample period, from 9 April 2001 to 2 March 2009; given that our IPOs were from 28 June 2002 to 27 August 2008, we were guaranteed to have at least 300 days of pre-IPO and 200 days off post-IPO daily return on the market portfolio. For the risk-free rate, we took the implicit cut-off yield on the 91-day treasury-bill which was reported in the website of the Reserve Bank of India.[1] We took these yields for the whole sample period and converted these weekly-rates to daily-rates by using the standard formula: daily-rate = $(1 + \text{weekly-rate})^{1/7} - 1$; this, of course, assumes that the daily rate during a week remains the same.

Section III: Methodology

Listing-date was taken by us to be day-0. We took three measures of cumulative pre-IPO return and excess return on the market from day -10 (that is, ten day preceding the listing-date) onwards. Return was the absolute daily return; so, cumulative pre-IPO return on the market on any day -T ($T < 10$ for us) was the sum of the absolute return from day -10 to day -T. Similarly,

[1] We thank Dr. Golak Nath of Clearing Corporation of India Limited (CCIL) for providing us a part of the risk-free data.

excess return (ER) on the market on any date was taken to be the absolute return minus the risk-free rate on that date; cumulative excess-return on market on any day –T was thus ER from day -10 to –T. We set T=1, as we were interested in the cumulative return and ER on the market from -10 to -1.

Then, we determined the day-0 absolute return and abnormal return on each share. Day-o absolute return was merely the daily return. The AR on a share, from day-0 onwards, was calculated in the following different ways.

a. $R_i - R_m$
b. $R_i - \beta R_m$
c. $(R_i - R_f) - \beta (R_m - R_f)$
d. $R_i - \beta_{LPM} R_m$
e. $(R_i - R_f) - \beta_{LPM} (R_m - R_f)$
f. $R_i - (\sigma_i^2 / \sigma_m^2) R_m$
g. $(R_i - R_f) - (\sigma_i^2 / \sigma_m^2) (R_m - R_f)$
h. $R_i - (LPM\text{-}2_i / LPM\text{-}2_m) R_m$
i. $(R_i - R_f) - (LPM\text{-}2_i / LPM\text{-}2_m) (R_m - R_f)$
j. $1- (1 + R_m) / (1 + R_i)$

Here, R_i refers to the return on the share, R_m to return on the market, and R_f to risk-free rate of return. Similarly, β refers to the CAPM beta, β_{LPM} to the LPM-beta, σ_i^2 to the variance of the daily return on the share, σ_m^2 to the variance of daily return on the market, $LPM\text{-}2_i$ to the LPM-2 on the share, and $LPM\text{-}2_m$ to the LPM-2 on the market. It is appropriate to discuss here about LPM and β_{LPM} and also talk briefly about the justification of some of the above risk-measures.

CAPM β is a well know measure of risk, but β_{LPM} is possibly less known. LPM refers to the Lower Partial Moment, which measures downside risk. LPM can be of different orders, from 1 upwards. LPM_2 (or LPM-2), the LPM of 2^{nd} order, which is akin to semivariance, is the most useful one. Though variance breaks down as a proper measure of risk unless utility functions exhibit some specific characteristics or asset returns belong to specific distributional class, LPM_2 does not require such restrictions. In fact, when returns are not elliptically distributed, M-V (Mean-Variance) is not the optimal rule, but M-LPM_2 (Mean- LPM_2) is "reasonably" optimal and does better than M-V rule; and, when stock returns distribution belong to the class of GLS2

(General Location and Scale of 2nd Order, to which elliptical distribution belongs), M-LPM_2 efficient frontier is identical to the M-V efficient frontier as shown by Mishra (1995).

Mishra and Rahman (2008), who have developed a novel Mean Equivalence approach for portfolio evaluation based on LPM-based risk measures, explain computation of LPM_2 through a simple example. To compute LPM, we require a benchmark. We took the standard benchmark, the riskfree rate. Using this, we compute LPM-2 for the market, which is the sum of squared deviations, but only for those periods in which the R_m is less than R_f. Similarly, LPM-2 for any asset I is calculated by summing up squared deviations, but only for those periods in which the R_i is less than R_f. For computing β_{LPM}, we need to take Co-LPM of the asset with respect to the market, which is similar to covariance, and divide it by LPM-2 of the market. For computing Co-LPM, we take only those periods in which R_m is less than R_f and compute the product of (Rm – Rf) and (Ri – Rf); the sum of these products is the Co-LPM. Thus, here, an asset is called risky only if it fails to give a higher return than the risk-free asset when market portfolio fails to do the same. An attractive property of β_{LPM} is, as Bawa and Lindenberg (1977) have shown, a Security Market Line can be derived using β_{LPM} exactly as in case of CAPM: $R_i = R_f + \beta_{LPM} (R_m - R_f)$.

For the market – or any other well diversified portfolio - variance measures both the total risk and the systematic risk. But, for individual assets, total risk is measured by the variance and the absolute systematic risk by the co-variance with respect to the market. The latter, however, is standardized by dividing it by the market's risk, and that gives the asset's beta, a measure of relative risk. So, we can develop another risk-measure by dividing the asset's total risk – as measured by its variance – by the market's variance. Similarly, we can develop another measure of relative risk by substituting the variance in the above measures by LPM-2. The last two models are useful when, respectively, Rm and Ri are unreasonably high. We develop wealth-relatives using these models, as has been done by other researchers. All the risk parameters were estimated on the basis of post-IPO data. For this, we first found out how many trading-days of post-IPO data a firm had; one year was approximately 250 trading days. We then took only a multiple of 250 post-IPO days (250, 500, 750, 1000, and 1250). Thus, if a firm had 280 post-IPO days, we took only 250 days of this to estimate its risk-measures.

Section IV: Analyses and Results

Table-1 presents total and year-wise information on the IPOs in our sample. As we see, the overall day-0 Ri of 33.16% is quite high and statistically highly significant. If we ignore

2001-2003 and 2009, which had very few IPOs, and look at the year-wise average day-0 Ri, we observe that it has somewhat steadily fallen through the years, whereas average issue-price has increased through the period. Table-2 highlights that the distribution of day-0 absolute return and AR are quite similar. It also reveals that while roughly 50 issues gave a negative listing-day return, almost the same number gave listing-day return above 50%; in fact, these high-return IPOs gave an average day-0 Ri just short of 100%!

Table-3 gives the cumulative pre-IPO (for days -10 to -1) absolute return and excess return on the market, average day-0 and day-1 absolute return and AR on the IPOs, as well as their CAR from day 2 to 11 as well as 1 to 11. Interestingly, cumulative absolute and excess return on the market was significantly positive prior to the IPOs, suggesting that the IPOs are "on the average" timed. As expected, average day-0 Ri was high positive, 33.16%. Interestingly, even the average day-1 return, though quite low positive, was significant, while it gets reversed by the cumulative return from 2 to 11, which has the opposite sign, though statistically insignificant. But, the reversal is sufficient to make the cumulative return from day 1 to 11 insignificantly different from zero. The story for ARs – whatever may be the risk measure used - is similar, but with one difference: the CAR from 2 to 11 is also significant; as in the case of absolute return, the reversal in case of ARs also makes the CAR from 1 to 11 insignificant. Of course, if we add AR_0, all CARs become significant. As Table-3 showed pre-IPO cumulative RM to be significantly positive, we analyzed the effect of pre-IPO cumulative Rm on day-0 Ri, by breaking the firms into five quintiles, based on the cumulative Rm (quintile-1 being the one with the highest pre-IPO cumulative-Rm). As we see in Table-4, the day-0 Ri steadily falls across the quintiles, save the slight glitch for the third quintile. But, when we break down the firms into two groups based on whether pre-IPO cumulative Rm is positive or negative, the contrast is sharp: the average day-0 Ri is 43% for the positive group and a meager 15% for the negative group.

Since Table-3 also showed that Ri – Rm moves quite closely with other ARs, we analyzed long-run CARs by comparing holding-period return on the stock to that on the market. It is seen in Table-5 that all CARs are insignificant, implying that the portfolio of IPO stocks earns a return equal to that on the market; only in the fourth year does the portfolio does poorly than Rm. Table-6 repeats this analysis for Ri – β Rm, but with a difference. We grouped the firms based on the number of post-IPO days used to estimate their risk-measures. Thus we had

five groups, allowing us to track the same groups of firms across the years (that is, across a row). It is seen that all the groups except the last one had significant CAR during the first year, while all had significant CARs during the second year. From the third year onwards, the CARs mostly fade away, suggesting that if we hold the stocks for more than two years after their IPOs, we would end up losing the abnormal return gained during the initial period.

To decipher if the "lucky" IPOs, those that had positive day-0 Ri and AR – they almost go hand in hand – were different from unlucky IPOs that had negative day-0 Ri and AR, we broke down our sample firms into two groups: based on day-0 Ri. As Table-7 shows, over the whole period from 2001 to 2009, the lucky or positive group had given an average day-0 return of 50.79% and AR of almost the same magnitude, while the corresponding figure for the latter group was around -14%. Year-wise day-0 Ri and AR_0 reveal the same picture, with the positive group giving significantly higher return that the negative group. Table-8 corroborates that the same conclusion is arrived at even when we group the firms on the basis of day-0 AR (= Ri – β Rm) instead of Ri.

We then extended our analysis to long-term holding-period return on the IPO shares – from day-1, not day-0 - over different intervals; the results are shown in Table-9. Anyway, as we see, for the negative group, all post-IPO holding-period return, except the second year and the four-years (starting from day-1), are insignificant; interestingly, the second-year return was negative and the four-years one positive. For the positive group, holding-period return for the first week (five days), first fortnight (ten days), first month (21 days), second month, third month, first quarter, second quarter, and first semester (half year) are insignificant. They start becoming significant from the second semester, which makes the one-year, two-years, three-years, and four-years return significantly positive. But, of course, as the numbers a bit down below suggest, it is not only due to the first-semester or first-year effect; holding-period returns for the second, third, fourth, and fifth year are all significantly positive for this "lucky" group.

Table-10 extends Table-3 to a group-wise analysis for the long-term; it shows one-year, two-year, three-year, four-year, and five-year CARs, which are based on ARs using four main risk measures: β, β_{LPM}, σ_i^2 / σ_m^2, and $LPM\text{-}2_i / LPM\text{-}2_m$. For the positive group, almost all CARs are positive; the only interesting aberration is that, for five-year one, while the β-based CAR is insignificant, the β_{LPM}-based CAR is significant. For the negative group, systematic-risk-based

CARs remain negative and significant up to two years and then become insignificant, but the total-risk-based CARs continue to be significant till the five-year horizon.

We wondered whether the high day-0 returns on the IPOs were related to the ex-post risk of these shares in the very short-run, say within a month of the IPOs. To measure this short-term risk, we took two measures for 5, 10, 15, and 30 post-IPO days. One was the commonly used standard-deviation of daily-return during the chosen window. The other one was a specific version of Parkinson's volatility measure, which is computed as follows:

$$\sqrt{\frac{1}{4\ln(2)}\sum_{1}^{T}\left[\ln\left(\frac{H_t}{L_t}\right)\right]^2 \Big/ T}$$

Table-11 presents some interesting results. For the positive group, there is a significantly positive relation between Parkinson's volatility measure and the day-0 Ri, while for the negative group, the correlation is significantly negative. This tells us that, positive-Ri IPOs experience a very highly volatile after-market, possibly due to high trading volume, while the negative-Ri IPOs experience a low volatility, suggesting a possible lack of interest in the issue. There could, of course, be other interesting explanations for this phenomenon. Interestingly, when we consider standard-deviation, the correlation is insignificant for the positive group and significantly positive for the negative group. So, market possibly correctly anticipates the riskiness in these "unfavorable" IPOs and rewards them with higher listing-day return for higher risk.

Table-12, which gives the correlation of day-0 Ri with long-term CARs, backs the famous statement that "nothing succeeds like success, nothing fails like failure": for the positive group, day-0 Ri continues the good work up to the third year, while, for the negative group, negative day-0 Ri continues the bad work till second year, whine it gets magnified (though, fortunately the trend reverses in the third year). This may possibly explain why the CAR for the negative group in Table-10 increases between year-1 and year-2, but falls thereafter. This inference is also supported by the top-panel of Table-13, which shows that the pre-IPO cumulative market return causes the CAR for the negative group to be as long as two years from the date after issue.

Table-13's bottom panel brings out what we should have just inferred: that the bullishness or bearishness of the market somehow affects the day-0 Ri and AR. But, we found that, whereas the correlations are insignificant for the positive group, they are high and significant for the negative group. Thus, IPOs giving negative day-0 return should blame the bearish market for their luck, whereas those giving positive return do not owe it to the bullish market. It should be recalled here that, on the average, the IPOs in our sample have been issued in a bullish market. That may explain why the overall mean day-0 Ri is so high and significant. To the IPOs, the capital-market is a "fair weather friend".

Section V: Summary and Conclusion

In this paper, we studied a variety of issues pertaining to 184 IPOs in India during April 2001 and March 2009. We found that there is, on the average only, significantly positive return on the listing-day and the day following that, which gets reversed - but not annulled - within ten days. When we group the firms into two groups based on whether they yielded positive or negative absolute return (using AR does not change this conclusion), many new insights are obtained. Not only does the 50%-plus day-0 average Ri for the former group is in sharp contrast with the -14% day-0 Ri for the latter, but the positive group does not gain anything from an up-market preceding the IPO, whereas a down-market is a major cause for the poor listing-day performance of the negative day-0 Ri group. Even the average holding-period return of the negative group (starting day-1, not day-0) becomes significant only after four years, while it is positive throughout for the positive group. Corresponding CARs - from day-1 onwards – continue to be positive for the positive group throughout and negative for the negative group up to two years, becoming statistically zero thereafter. It is observed that positive group has gained nothing from the pre-IPO mood in the market, whereas this mood is an important determinant of the "poor show" by the negative group. Positive-group IPOs experience significant intra-day volatility in the after-market up to thirty days and it is the reverse for the negative group; but, whereas the negative group's day-0 Ri is related to its post-IPO standard-deviation of returns in the after-market, they are unrelated for the positive group.

References:

Acharya, B. (2009). "Only Three IPOs Out of 10 Deliver Positive Returns", *Hindu Business Line,* Vishakhapatnam Edition, 21 September, Headline

Aggarwal, R., and Rivoli, P. (1990), "Fads in the initial public offerings market?", *Financial Management*, 22, 42-53

Agarwalla, S. K. (2008), "Underpricing of initial public offerings: an empirical analysis of Indian IPO market", *International Journal of Strategic Management*, 1 February

Bawa, V.S. and Lindenberg, E.B. (1977), "Capital Market Equilibrium in a Mean-Lower Partial Moment Framework", *Journal of Financial Economics*, Vol 5, pp 189-200

Beatty, R. and Ritter, J. (1986), "Investment Banking, Reputation and the Underpricing of Initial Public Offerings", *Journal of Financial Economics*, pp 213-232

Benveniste, L. M and Spindt, P. A. (1989), "How Investment Bankers Determine the Offer Price and Allocation of New Issues", *Journal of Financial Economics*, 24, pp 213-232

Block, S. and Stanley, M. (1980), "The Financial Characteristics and Price Movement Patterns of Companies Approaching the Unseasoned Securities Market in the Late 1970s", *Financial Management*, Winter, pp 30-36

Brown, J. M. (1970), "Post –Offering Experience of Companies Going Public", *Journal of Business*, January, pp 10-18

Brown, S. J.. and Warner, J. B. (1985), "Using daily stock returns : The case of event studies," *Journal of Financial Economics*, Vol 14: Issue 1, pp 3-31, March

Deb, S.G. (2009). "Some Insights into IPO Underpricing in India", September, *Vilakshan*, Vol 6: Issue 2, pp 1-14

Garg, A., Arora, P. and Singla, R. (2008), "IPO Underpricing in India", ICFAI Journal of Applied Finance, March, Vol. 14: Issue 3, pp 33-42,

Ghosh, S. (2005), "Underpricing of Initial Public Offerings", *Emerging Markets, Finance & Trade*, Nov/Dec, Vol. 41: Issue 6, pp 45-

Gompers, P. and Lerner, J. (2003), "The Really Long-Run Performance of Initial Public Offerings: The Pre-Nasdaq Evidence", *Journal of Finance*, August, Vol 58: Issue 4, 1355-1392

Ibbotson, R.G. (1975), "Price Performance of Common Stock New Issues", *Journal of Financial Economics*, 2, pp 235-272

Ibbotson, R.G. and Jaffe, J.F. (1975), "Hot Issue Markets", *Journal of Finance*, Vol 30, pp 1027-1042

Janakiramanan, S. (2008), "Under-Pricing and long run performance of Initial Public Offerings in Indian Stock Market", National Stock Exchange of India Research Papers, National Stock Exchange of India, 2008

Jain, B. and Kini, O. (1994), "The Post-Issue Operating Performance of IPO Firms", *Journal of Finance*, Dec, Vol 49: No. 5, pp 1699-1726

Koh, F. and Walter, T. (1989), "A Direct Test of Rock's Model of the Pricing of Unseasoned Issues' , *Journal of Financial Economics*, 23, pp 252-272

Leleux, Benoît F. (1993), "Introductions en bourse sur le second marché : analyse de performance**,** *Finance*, December, Vol 14: Issue 2, pp 79-106

Logue, D.E. (1973), "On the Pricing of Unseasoned New Issues,1965-69", *Journal of Financial and Quantitative Analysis*, January, pp 92-103

_____ (1973), "Premia on Unseasoned Equity Issues", *Journal of Economics and Business*, Spring Summer, pp 133-141

Loughran, T. and Ritter, J. (1993), "The Timing and Subsequent Performance of the IPOs: Implications for the Cost of Equity Capital", *University of Illinois Mimeo*, 27 April

Madhusoodanan ,T.P. and Thiripalraju, M. (1997), "Underpricing in Initial Public Offerings: The Indian Evidence", *Vikalpa*, Vol. 22, pp 17-30.

Mayur, M and Kumar, M. (2009), "Ownership and Performance in an Emerging Market: Evidence from Indian IPO Firms", *ICFAI Journal of Applied Finance*, July, Vol 15: Issue 7, pp 5-23

McDonald, J.G. and Fisher, A.K. (1969), "New Issue Stock Price Behaviour", *Journal of Finance*, Vol 27, pp 97-102

Mishra, B. (1995), "Why Should We Prefer the Mean-LPM Rule to the Mean-Variance Rule?", *XIMB (Xavier Institute of Management – Bhubaneswar) Working Paper 1995/BM:1*, (Paper Presented at the Seminar on Investments at New York University Business School)

Mishra, B. and Rahman, M. (2008), "Evaluating Portfolio Performance: LPM-Based Risk Measures and the Mean-Equivalence Approach", In Frank Fabozzi (Ed.), *Handbook of Finance: Volume II*, John Wiley (USA), pp 229-236

Nandha, M.S. and Sawyer, K.R. (2002), "Ex-ante uncertainty in initial public offerings: The Indian market", *Finance India*, Sep, Vol 16: Issue 3, pp 961-976

Neuberger, B. M. and LaChapelle, C.A. (1983), "Unseasoned New Issue price performance on Three Tiers: 1975 – 1980", *Financial Management*, Autumn, pp 23-28

Pande, Alok and Vaidyanathan, R. (2009), *ICFAI Journal of Applied Finance*, Jan, Vol 15: Issue 1, pp. 14-30

Reilley, F. K. (1973), "Further Evidence on Short Run Results for New Issue Investors' , *Journal of Financial and Quantitative Analysis*, January, pp 83-90

_____ (1977), "New Issues Revisited", *Financial Management*, Winter, pp 28-42

Reilley, F. K. and Hatfield. (1969), "Investor experience with New Stock Issues", *Financial Analysts' Journal*, September-October, pp 73-80

Ritter, J.R. (1984), "The Hot Issue Market of 1980", *Journal of Business*, Vol 57, pp 215-240

_____ (1991), "The long-run performance of initial public offerings", *The Journal of Finance*, Vol 46: Issue 1, pp 3-27

Rock, K. (1986), "Why New Issues are Underpriced", *Journal of Financial Economics*, March, pp 187-212

Stoll, H. R. and Curley, A. J. (1970), "Small Business and the New Issue Market for Equities", *Journal of Financial and Quantitative Analysis*, September, pp 309-322

Table-1: Yearwise Issue Characteristics

Year	No of Issues	Total Issue Size (Rs. Crore)	Average Price	R_i	SD	t-Statistics	Significance
2001	1	41.13	300	-48.20%	NA	NA	NA
2002	1	209.97	530	-5.46%	NA	NA	NA
2003	2	236.87	94	87.32%	86.87%	9.75	***
2004	16	12235.88	141	44.86%	54.04%	9.85	***
2005	30	8312.45	202	41.08%	50.43%	11.58	***
2006	52	12459.81	227	30.95%	43.38%	10.74	***
2007	63	28445.89	238	27.64%	52.69%	8.09	***
2008	18	14639.50	261	30.53%	76.29%	6.46	***
2009	1	23.84	60	129.50%	NA	NA	NA
2001-2009	184	76605.34	222	33.16%	53.40%	9.25	***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Table-2: Distribution of Day-0 Raw Return and AR

Range	Number of Issues	% of Total	Average Day-0 Ri	Number of Issues	Average Day-0 AR
> 100%	13	7%	183.06%	13	183.04%
> 50%	49	27%	96.82%	50	96.04%
> 30%	79	43%	75.37%	81	74.41%
> 15%	107	58%	61.44%	108	61.22%
> 0%	134	73%	50.19%	135	49.96%
> -15%	165	90%	39.54%	164	40.01%
> -30%	178	97%	35.03%	178	35.14%
> -50%	184	100%	32.63%	184	32.74%

Table-3

Day-0 Raw Return and AR and Post-IPO CAR from 1 to 11

AR or CAR computed	From	To	Mean	SD	N	t-stat	Signif
Cumulative Rm	-10	-1	1.16%	4.87%	184	3.23	***
Cumul (Rm - Rf)	-10	-1	0.99%	4.87%	184	2.75	***
Ri	0	0	33.16%	53.40%	184	8.42	***
	1	1	1.44%	8.35%	184	2.35	**
	2	11	-2.08%	18.04%	184	-1.56	
	1	11	-0.64%	19.90%	184	-0.43	
Ri - Rm	0	0	33.29%	53.43%	184	8.45	***
	1	1	1.31%	8.01%	184	2.21	**
	2	11	-3.74%	18.41%	184	-2.76	***
	1	11	-2.44%	20.42%	184	-1.62	
(1+Ri/1+Rm) - 1	0	0	33.37%	53.84%	184	8.41	***
	1	1	1.29%	8.01%	184	2.18	**
	2	11	-3.76%	18.41%	184	-2.77	***
	1	11	-2.47%	20.42%	184	-1.64	
Ri - β Rm	0	0	33.23%	53.43%	184	8.44	***
	1	1	1.38%	8.04%	184	2.32	**
	2	11	-3.67%	18.23%	184	-2.73	***
	1	11	-2.29%	20.29%	184	-1.53	
(Ri-Rf) - β_{LPM} (Rm-Rf)	0	0	33.19%	53.29%	184	8.45	***
	1	1	1.40%	8.15%	184	2.33	**
	2	11	-3.73%	18.17%	184	-2.78	***
	1	11	-2.33%	20.30%	184	-1.55	
Ri - (σ_i^2/σ_m^2) Rm	0	0	33.67%	55.01%	184	8.30	***
	1	1	1.15%	10.72%	184	1.46	
(Ri - Rf) - (σ_i^2/σ_m^2) (Rm - Rf)	1	1	0.80%	4.97%	184	2.19	**
	2	11	-3.13%	20.47%	184	-2.07	**
	1	11	-2.33%	20.30%	184	-1.55	

Table-4

Pre-IPO Cumulative Return on Market and Day-0 Ri

Quantile	Rm	Day-0 Ri	SD	N	t-stat	Signif
1	7.13%	53.37%	76.08%	37	4.27	***
2	3.83%	36.34%	28.66%	37	7.71	***
3	2.05%	47.77%	58.56%	37	4.96	***
4	-1.03%	17.45%	38.56%	37	2.75	***
5	-6.37%	10.22%	39.78%	36	1.54	
Positive Cumulative Rm	4.06%	43.14%	56.67%	120	8.34	***
Negative Cumulative Rm	-4.20%	15.08%	40.87%	65	2.97	***

Table-5

Ri, Rm, and Ri - Rm Over Different Holding Periods

Period	Ri	Rm	Ri - Rm	t-stat	Signif
1st Qtr	3.65%	5.59%	-1.94%	-0.49	
2nd Qtr	3.05%	4.78%	-1.73%	-0.81	
1st Sem	7.28%	10.41%	-3.13%	-0.62	
2nd Sem	6.68%	7.87%	-1.19%	-0.36	
1st Year	21.42%	21.32%	0.10%	0.01	
2nd Yr	12.93%	10.59%	1.86%	0.29	
3rd Yr	-17.83%	-9.93%	-7.90%	-1.39	
4th Yr	-17.43%	-1.40%	-16.03%	-2.67	***
5th Yr	-21.26%	-14.77%	-6.49%	-0.46	
1 Year	21.42%	21.32%	0.10%	0.01	
2 Yrs	65.22%	54.15%	10.40%	0.54	
3 Yrs	132.49%	80.56%	51.92%	0.77	
4 Yrs	227.79%	171.44%	56.35%	0.65	
5 Yrs	369.33%	186.72%	182.60%	0.72	

Table-6

	Post-IPO CAR for Number of Days				
	250	500	750	1000	1250
No of Post-IPO Days used in Estimating Risk Parameter					
250	-46.31%				
SD	51.17%				
N	47				
t-stat	-6.20				
Signif	***				
500	42.91%	-44.01%			
SD	92.67%	49.85%			
N	51	51			
t-stat	3.31	-6.30			
Signif	***	***			
750	17.50%	117.55%	-3.61%		
SD	76.12%	258.79%	108.35%		
N	53	53	53		
t-stat	1.67	3.31	-0.24		
Signif	*	***			
1000	96.11%	212.67%	585.00%	195.68%	
SD	170.78%	442.49%	1427.32%	552.44%	
N	14	14	14	14	
t-stat	2.11	1.80	1.53	1.33	
Signif	**	*			
1250	101.64%	122.93%	165.98%	253.52%	372.18%
SD	246.30%	162.54%	263.00%	436.51%	1114.41%
N	13	13	13	13	13
t-stat	1.49	2.73	2.28	2.09	1.20
Signif		***	**	**	

Table-7

Grouped by Ri

Year		Positive Group		Negative Group		Differnce of means t-stat	Signif
		Nos	Average	Nos	Average		
2002	Ri			1	-5.46%		
	$R_i - R_m$			1	-6.32%		
	$R_i - \beta R_m$			1	-4.55%		
	$R_i - \beta_{LPM} R_m$			1	-4.95%		
2003	Ri	2	87.32%				
	$R_i - R_m$	2	87.52%				
	$R_i - \beta R_m$	2	87.19%				
	$R_i - \beta_{LPM} R_m$	2	87.21%				
2004	Ri	14	51.63%	2	-2.49%	3.71	***
	$R_i - R_m$	14	51.60%	2	-2.78%	3.86	***
	$R_i - \beta R_m$	14	52.05%	2	-1.69%	3.73	***
	$R_i - \beta_{LPM} R_m$	14	51.80%	2	-1.78%	3.71	***
2005	Ri	26	48.08%	4	-4.46%	5.22	***
	$R_i - R_m$	26	48.14%	4	-4.72%	5.13	***
	$R_i - \beta R_m$	26	47.90%	4	-4.28%	5.13	***
	$R_i - \beta_{LPM} R_m$	26	48.02%	4	-4.39%	5.18	***
2006	Ri	38	45.83%	14	-9.43%	7.77	***
	$R_i - R_m$	38	45.56%	14	-9.09%	7.80	***
	$R_i - \beta R_m$	38	46.09%	14	-9.02%	7.68	***
	$R_i - \beta_{LPM} R_m$	38	45.95%	14	-9.20%	7.72	***
2007	Ri	42	50.74%	21	-18.57%	8.52	***
	$R_i - R_m$	42	51.18%	21	-18.30%	8.54	***
	$R_i - \beta R_m$	42	50.82%	21	-18.76%	8.55	***
	$R_i - \beta_{LPM} R_m$	42	50.82%	21	-18.67%	8.54	***
2008	Ri	11	59.61%	7	-15.17%	2.85	***
	$R_i - R_m$	11	58.72%	7	-13.90%	2.78	***
	$R_i - \beta R_m$	11	59.76%	7	-15.14%	2.85	***
	$R_i - \beta_{LPM} R_m$	11	59.69%	7	-15.15%	2.90	***
2001-2009							
	Ri	134	50.79%	50	-14.10%	13.48	***
	$R_i - R_m$	134	50.81%	50	-13.68%	13.37	***
	$R_i - \beta R_m$	134	50.91%	50	-13.99%	13.45	***
	$R_i - \beta_{LPM} R_m$	134	50.86%	50	-14.03%	13.46	***

Table-8

Grouped by Ri - b Rm

Year		Positive Group		Negative Group		Differnce of means t-stat	
		Nos	Average	Nos	Average		
2002	Ri			1	-5.46%		
	$R_i - R_m$			1	-6.32%		
	$R_i - \beta R_m$			1	-4.55%		
	$R_i - \beta_{LPM} R_m$			1	-4.95%		
2003	Ri	2	87.32%	0			
	$R_i - R_m$	2	87.52%	0			
	$R_i - \beta R_m$	2	87.19%	0			
	$R_i - \beta_{LPM} R_m$	2	87.21%	0			
2004	Ri	14	51.63%	2	-2.49%	2.69	***
	$R_i - R_m$	14	51.60%	2	-2.78%	3.78	***
	$R_i - \beta R_m$	14	52.05%	2	-1.69%	3.71	***
	$R_i - \beta_{LPM} R_m$	14	51.80%	2	-1.78%	3.71	***
2005	Ri	26	48.08%	4	-4.46%	5.67	***
	$R_i - R_m$	26	48.14%	4	-4.72%	5.03	***
	$R_i - \beta R_m$	26	47.90%	4	-4.28%	5.18	***
	$R_i - \beta_{LPM} R_m$	26	48.02%	4	-4.39%	5.15	***
2006	Ri	39	44.62%	13	-10.06%	6.67	***
	$R_i - R_m$	39	44.34%	13	-9.63%	6.24	***
	$R_i - \beta R_m$	39	45.00%	13	-10.00%	6.36	***
	$R_i - \beta_{LPM} R_m$	39	44.81%	13	-10.04%	6.01	***
2007	Ri	42	50.74%	21	-18.57%	8.92	***
	$R_i - R_m$	42	51.18%	21	-18.30%	8.95	***
	$R_i - \beta R_m$	42	50.82%	21	-18.76%	8.83	***
	$R_i - \beta_{LPM} R_m$	42	50.82%	21	-18.67%	8.18	***
2008	Ri	11	59.61%	7	-15.17%	2.85	***
	$R_i - R_m$	11	58.72%	7	-13.90%	2.74	***
	$R_i - \beta R_m$	11	59.76%	7	-15.14%	2.85	***
	$R_i - \beta_{LPM} R_m$	11	59.69%	7	-15.15%	2.85	***
2001-2009							
	Ri	135	50.40%	49	-14.36%	13.48	***
	$R_i - R_m$	135	50.42%	49	-13.91%	13.37	***
	$R_i - \beta R_m$	135	50.56%	49	-14.35%	13.51	***
	$R_i - \beta_{LPM} R_m$	135	50.49%	49	-14.35%	13.49	***

Table-9

Listing-Date and Post-IPO Holding-Period Return for Two Groups

AR or CAR fo	Group with Positive Day-0 R_i					Group with Negative Day-0 R_i				
	Mean	**SD**	**N**	**t-stat**	**Signif**	**Mean**	**SD**	**N**	**t-stat**	**Signif**
Day 0	50.79%	52.12%	134	11.28	***	-14.10%	12.06%	50	-8.27	***
Day 1	2.08%	9.36%	134	2.58	***	0.91%	7.64%	50	0.84	
Day 0+1	53.97%	57.04%	134	10.95	***	-13.34%	13.43%	50	-7.02	***
1st Week	1.71%	17.65%	134	1.12		-1.05%	12.88%	50	-0.58	
1st Fortnight	0.81%	20.10%	134	0.47		-1.30%	19.34%	50	-0.47	
1st Mth	2.28%	30.97%	134	0.85		-3.17%	24.51%	50	-0.91	
2nd Mth	-1.99%	21.79%	134	-1.06		0.40%	19.00%	50	0.15	
3rd Mth	2.45%	21.44%	134	1.32		0.01%	19.08%	50	0.00	
1st Qtr	5.74%	60.64%	134	1.10		-1.93%	41.65%	50	-0.33	
2nd Qtr	1.42%	33.92%	133	0.48		6.68%	30.65%	50	1.54	
1st Sem	7.90%	73.98%	133	1.23		7.21%	72.81%	50	0.70	
2nd Sem	8.07%	53.27%	131	1.73	*	2.86%	62.84%	48	0.32	
1st Yr	24.84%	125.95%	131	2.26	**	12.09%	84.40%	48	0.99	
2 Yrs	97.20%	273.47%	94	3.45	***	-13.88%	87.27%	38	-0.98	
3 Yrs	148.70%	690.45%	67	1.76	*	54.88%	179.40%	14	1.14	
4 Yrs	249.27%	535.29%	22	2.18	**	149.02%	212.37%	6	1.72	*
5 Yrs	380.49%	1261.68%	10	0.95		341.43%	437.26%	4	1.56	
2nd Yr	31.99%	99.11%	94	3.13	***	-34.21%	42.44%	38	-4.97	***
3rd Yr	-21.58%	62.56%	67	-2.82	***	0.12%	110.58%	14	0.00	
4th Yr	-19.72%	51.33%	22	-1.80	*	-9.04%	45.96%	6	-0.48	
5th Yr	-36.59%	64.09%	10	-1.81	*	17.05%	93.36%	4	0.37	

Table-10

Long-Term CARs for the Two Groups

	Group with Positive Day-0 R_i					Group with Negative Day-0 R_i				
CAR	Mean	SD	N	t-stat	Signif	Mean	SD	N	t-stat	Signif
1-Year CARs: $R_i - \beta R_m$	39.43%	75.66%	131	5.97	***	-27.35%	56.57%	48	-3.35	***
$R_i - \beta_{LPM} R_m$	42.45%	81.34%	131	5.97	***	-24.39%	62.82%	48	-2.69	***
$R_i - (\sigma_i^2/\sigma_m^2) R_m$	10.91%	201.85%	131	0.62		-73.65%	161.99%	48	-3.15	***
$R_i - (LPM\text{-}2_i/LPM\text{-}2_m) R_m$	20.18%	74.17%	131	3.11	***	-44.92%	54.73%	48	-5.69	***
2-Year CARs: $R_i - \beta R_m$	47.37%	84.75%	94	5.42	***	-57.29%	76.32%	38	-4.63	***
$R_i - \beta_{LPM} R_m$	60.24%	91.98%	94	6.35	***	-54.97%	82.58%	38	-4.10	***
$R_i - (\sigma_i^2/\sigma_m^2) R_m$	-98.97%	175.43%	94	-5.47	***	-84.10%	149.45%	38	-3.47	***
$R_i - (LPM\text{-}2_i/LPM\text{-}2_m) R_m$	2.32%	85.24%	94	0.26		-71.58%	73.51%	38	-6.00	***
3-Year CARs: $R_i - \beta R_m$	37.14%	111.24%	67	2.73	***	-19.06%	80.87%	14	-0.88	
$R_i - \beta_{LPM} R_m$	51.37%	117.56%	67	3.58	***	-10.60%	83.89%	14	-0.47	
$R_i - (\sigma_i^2/\sigma_m^2) R_m$	-113.56%	160.03%	67	-5.81	***	-166.53%	156.48%	14	-3.98	***
$R_i - (LPM\text{-}2_i/LPM\text{-}2_m) R_m$	-11.86%	106.95%	67	-0.91		-83.65%	100.78%	14	-3.11	***
4-Year CARs: $R_i - \beta R_m$	51.71%	123.10%	22	1.97	**	-21.28%	119.91%	6	-0.43	
$R_i - \beta_{LPM} R_m$	71.64%	131.43%	22	2.56	**	-4.71%	126.24%	6	-0.09	
$R_i - (\sigma_i^2/\sigma_m^2) R_m$	-219.68%	143.01%	22	-7.20	***	-284.06%	197.97%	6	-3.51	***
$R_i - (LPM\text{-}2_i/LPM\text{-}2_m) R_m$	-58.07%	98.17%	22	-2.77	***	-164.50%	151.02%	6	-2.67	***
5-Year CARs: $R_i - \beta R_m$	52.02%	115.73%	10	1.42		-1.74%	149.67%	4	-0.02	
$R_i - \beta_{LPM} R_m$	62.53%	119.19%	10	1.66	*	15.87%	166.30%	4	0.19	
$R_i - (\sigma_i^2/\sigma_m^2) R_m$	-182.10%	123.04%	10	-4.68	***	-294.88%	226.20%	4	-2.61	***
$R_i - (LPM\text{-}2_i/LPM\text{-}2_m) R_m$	-66.08%	96.48%	10	-2.17	**	-199.42%	216.98%	4	-1.84	*

Table-11

Correlations of Day-0 R_i

WITH	For the Positive Day-0 Ri Group	N	t-stat	Sig	For the Nagative Day-0 Ri Group	N	t-stat	Sig
Post -IPO 5-day Parkinson σ_i of stock	0.54	134	7.31	***	-0.59	50	-5.11	***
Post -IPO 10-day Parkinson σ_i of stock	0.52	134	7.06	***	-0.59	50	-5.12	***
Post -IPO 15-day Parkinson σ_i of stock	0.51	134	6.88	***	-0.61	50	-5.31	***
Post -IPO 30-day Parkinson σ_i of stock	0.48	134	6.31	***	-0.52	50	-4.22	***
Post -IPO 5-day standard σ_i of stock	0.10	134	1.19		0.33	50	2.42	**
Post -IPO 10-day standard σ_i of stock	-0.05	134	-0.56		0.36	50	2.68	***
Post -IPO 15-day standard σ_i of stock	-0.09	134	-1.00		0.37	50	2.74	***
Post -IPO 30-day standard σ_i of stock	-0.09	133	-1.09		0.42	50	3.18	***

Table-12

Correlations of Day-0 R_i

WITH	For the Positive Day-0 Ri Group	N	t-stat	Sig	For the Nagative Day-0 Ri Group	N	t-stat	Sig
1-Year Post-IPO CAR = Ri - β Rm	0.55	131	7.55	***	0.00	48	-0.02	
2-Year Post-IPO CAR = Ri - β Rm	0.32	94	3.22	***	0.30	38	1.89	*
3-Year Post-IPO CAR = Ri - β Rm	0.35	67	3.01	***	-0.52	14	-2.11	**
4-Year Post-IPO CAR = Ri - β Rm	0.32	22	1.50		-0.45	6	-1.02	

Table-13

Correlations of Cumulative Pre-IPO Rm

WITH	For Positive Day-0 Ri group	N	t-stat	Signif	For Negative Day-0 Ri group	N	t-stat	Signif
1-Year Post-IPO CAR = $R_i - \beta R_m$	0.05	131	0.52		0.07	48	0.51	
2-Year Post-IPO CAR = $R_i - \beta R_m$	0.06	94	0.61		0.43	38	2.82	***
3-Year Post-IPO CAR = $R_i - \beta R_m$	-0.09	67	-0.77		-0.42	14	-1.58	
4-Year Post-IPO CAR = $R_i - \beta R_m$	0.02	22	0.09		-0.51	6	-1.20	
WITH DAY-0								
Ri	0.11	134	1.22		0.50	50	3.96	***
$R_i - R_m$	0.10	134	1.21		0.46	50	3.58	***
$R_i - \beta R_m$	0.11	134	1.23		0.51	50	4.08	***
$R_i - \beta_{LPM} R_m$	0.11	134	1.23		0.50	50	4.03	***