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INVESTMENT SENSITIVITY AND MANAGERIAL DECISION MAKING BEHAVIOUR OF INDIAN FIRMS

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Abstract

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Contemporary models of the financial theory support the proposition that the stock prices should be fundamentally a reflection of the discounted value of earnings. Accordingly the investors and analysts should base their expectations on the expected future cash flows that are logically correlated or have a carry over effect vis-à-vis present stream of cash flows. This logically implies that the managers would have an incentive to manipulate investor's expectation of future cash flows. The zeal to maximize the firm's value based on market capitalization is expected to have a detrimental effect on the investment decisions leading to sub optimality. Given the imperfect information structure and market pressures, the Indian firms suffer from mispricing and as such the conventional robust theoretical models of agency conflicts cannot be refuted.

This motivates us to examine the interrelation ship between the concerns for valuation and investment sensitivity. We use a sample statistics of selected listed firms that represent the CNX Nifty Index and test for the dependence of the investment behavior of the firm, on the sensitivity of the firms' share prices to its current cash flow represented by surprise earings. We use the earnings response coefficient (ERC) framework proposed by Ball and Brown (1968) for 11 key industries in India. We find that the surpise in accounting earnings announcements is negatively associated with abnormal stock returns and the investment decisions taken by the firms are negatively sensitive to changes in investment opportunities.

investment behavior, earnings response coefficient, imperfect information, investment sensitivity

One of the most important decisions in Corporate Finance is the formulation of *optimal investment strategies by firms*. The impact of these decisions continues for many years and hence the firms have to ensure the optimal allocation of capital to the right investment projects. The firms thus allocate limited resources with competing opportunities for achieving their ultimate goal of maximizing shareholder value. Pawlina and Renneboog (2005) establish that outside block holders influence firms' investment policies and the types of outside block holders determine the diversified abilities and motivations to monitor management and influence firms' investments. Kaplan and Zingales (1997) show that an increase in the investment/cash flow sensitivity is not necessarily an increase in the degree of financial constraints. Cleary (1999) suggest that investments of large firms and firms with high payout ratios have higher sensitivity to internal funds than small firms and firms with lower payout ratios.

The financial theory supports the proposition that the stock price of the firm should equal the present discounted value of the firm's future cash flows. But the investors ideally build their expectations about the future cash flows based on the present stream of cash flows. Thus the information content in present earnings influences the investor's expectation of future earnings. This information can be captured using Earning Response Coefficients, which is the coefficient that relates the surprise in accounting earnings announcements to abnormal stock returns.

Earnings response coefficient looks at the extent of security's abnormal market return with respect to the unexpected aspect of reported earnings. The reasons for differences in market response could be many; one case could be variations in beta of companies. The higher the risk associated with the firm's expected returns the lower will be the reaction of the investor to a particular amount of unexpected earnings. Also, Capital structure could be a factor where we could expect that ERC for a highly levered firm is lower than a firm with little or no debt as any good news circulated indicates that the debt holders get this benefit instead of investors. Sources of increase in current earnings could also affect the level of ERC. Earnings expected to persist into the future will result in a higher ERC and if the component in the earnings is non-persistent that will result in a lower ERC.

This stock price sensitivity to earning news further leads us to a question that – Whether a concern about the stock prices by managers lead to investment distortions? Given the importance of current earnings in explaining future earnings the managers would have an incentive to manipulate investor's expectation of future earnings. Hence, the goal to maximize the firm's value based on market capitalization is expected to have an effect on the investment decisions of the firm. Our paper is an attempt to study how firms differ in their investment sensitivity in cases where there share prices are responsive and also in cases where there are unresponsive to earning news.

LITERATURE REVIEW

Ball and Brown (1968) were one of the pioneers in documenting the relationship between returns and earnings to assess the usefulness of existing accounting income numbers by examining its information content and timeliness. Beaver (1989) shows that the reported earnings per share in the financial statements are a very important figure perceived by the investors. Earning numbers facilitate analysts and investors to forecast future cash flows and deal with relative investments risks.

There have been many studies that have tried to document the reasons, situations and benefits of the relationship between market returns and earnings. Stein (1989) shows the model of myopic corporate behaviour wherein public firm managers in order to avoid negative earning surprises take decisions at the expense of long term benefits. Managers try to influence investors by reporting higher current cash flows, in the hope that investors will increase their expectations of future cash flows in response. To boost today's price, the manger under invests, hence creating impression that the firm's current and future profitability is greater than what it really is.

The model of Bebchuk and Stole (1993) works on the effects of short run objectives and imperfect information on long run investment decisions. They argue that when the market has incomplete information regarding the return of the investment from long-term projects but can observe investment levels, managers in a desire to impress the stock market may over-invest. Thus, a concern with near-term stock prices or reputation can lead to investment distortions. Graham, Harvey, and Rajagopal (2005) quote that majority of managers would forgo a project with positive net present value (NPV) if the project would cause them to fall short of the current quarter consensus forecast. Bhojraj *et al.* (2009) worked on firms that manage earnings to beat analyst forecasts for a better short-term stock price performance with reductions in discretionary spending and firms that increase discretionary expenditures and end up missing analyst forecasts. They document that firms that beat forecasts with low quality earnings have a short-run stock price advantage and under perform at a longer horizon relative to the set of firms that increased discretionary expenditures and missed forecasts.

Gompers (1996) and Baker (2000) study venture capital firms for trends in investment distortions. Baker (2000) talks about the career concern approach of managerial behaviour towards investment decisions and argue that if young venture capital firms are to attract more capital – are more likely than older venture firms to take distortionary actions to enhance their near-term performance. Gompers (1996) documents that there is a tendency of distortionary short-run performance boosting by younger venture firms, who in order to enhance their reputation take their start-ups public at an earlier stage of their life-cycle than do older, more established venture firms.

Studies related to the information content of accounting earnings has a significant contribution from Easton and Zmijewski (1989), who study the variation in the stock market response to announcements of accounting earnings for a sample of 216 firms using Earnings Response Coefficients. They document that there is a positive relation between the ERC and coefficient that relate current earnings to future earnings, a positive relation between ERC and firm size, but a negative relationship between ERC and systematic risk. Other contributions related to ERC's include work from Colins and Kothari (1989), who show that stock price change associated with a given unexpected earnings change (the earnings response coefficient) exhibits cross-sectional and temporal variation. Chambers *et al.* (2005) find a robust positive relation between ERCs and total risk that is both economically and statistically significant, and a little empirical support for a negative relation between ERCs and systematic risk. Roger and Robert (1987) find no evidence of the reactions of stock returns to unexpected earnings to be excessively volatile. Hotchkiss and Strickland (2003) show that when firm reports earnings below the analysts expectations, the response is more negative for firms with highert levels of ownership by momentum or agrresive growth investors. Freemen and Senyo (1982) show that marghinal

response of stock price to unexpected earnings declines as the absolute magnitude of unexpected earnings increases.

Imhoff and Lobo (1992) find that firms with low consensus in the analysts' forecasts of earnings tend to have a low ERC. Teoh and Wong(1993) show that ERC is significant for firms with high perception of auditor quality. Ariff and Cheng (2011) show that in case of banking firms the information relating to total earnings influences share prices significantly with an apparent use of information on disaggregated non-interest fee income to revise share prices significantly. Asker, Mensa and Ljungqvist (2012) by using industry wise Earning Response Coefficients analyse the difference in investment sensitivities for private and public sector firms in the US over the period 2001–2007. They report that for cases where ERC = 0, there is no significant difference in investment sensitivities between public and private firms but as ERC increases the difference in investment sensitivities between these firms also increases.

METHODOLOGY

We estimate the ERC of 50 firms representing the CNX Nifty Index using the panel data for a sample period of 10 quarters during the period December 2010 to December 2012. We further classify these firms into 11 representative industrial sectors and estimate the ERC respectively for these sectors. We use the Prowess database of Indian firms with due support from Bloomberg statistics run on E-views 7.0 and present the results.

Theoretical Framework

Garman and Ohlson (1980) and Ohlson (1987a, b, 1988) present theoretical models that show that stock price is a function of all information variables that predict dividends. If the function of time-series processes for the information variables that predict dividends is linear, then price may also be expressed as a linear function of these information variables. According to Easton and Zimvejki this model may be used to derive the ERC for accounting earnings i.e. response coefficients for information variables

In the Garman and Ohlson framework, if there are ψ information variables for firm j, at time t, that predict dividends ($Z_{\psi jt}$, ψ = 1, …, ψ) of which Z_{1jt} is accounting earnings (A_{jt}), then, Pjt which is price at time t can be expressed as

$$P_{jt} = C_{j0} + C_{j1}A_{jt} + C_{j2}Z_{2jt} + \ldots + C_{j\psi}Z_{\psi jt}.$$

In the above equation $C_{j\psi s}$ are the response coefficients of which C_{j1} is the ERC. Response coefficients can be treated as capitalization factors for the information variables. Following Garman and Ohlson (1980) and Easton and Zmijewski (1989) response coefficients are a function of risk and the time-series parameters relating the information variable to future dividends and future information variables. The ERC (C_{j1}) here for example is a function of risk and of the time-series parameters relating accounting earnings to future dividends, future accounting earnings, and future nonearnings information variables that predict dividends.

Also the abnormal return over a specified period may be written as a linear function of the new information that arrives during that period. The capitalization factors for the information variables are the respective response coefficients. Thus as per Easton and Zmijewski (1989) abnormal return (for period $t - \alpha$ through t) which is defined as realized return less expected return can be formalized in the following equation

$$r_{jt} - E_{t-\alpha}(r_{jt}) = C_{j1}[A_{jt} - E_{t-\alpha}(A_{jt})]/P_{jt-\alpha} +$$

$$+ C_{j2}[Z_{jt} - E_{t-\alpha}(Z_{2jt})]/P_{jt-\alpha} + \ldots + C_{j\psi}[Z_{\psi jt} - E_{t-\alpha}(Z_{\psi jt})]/P_{jt-\alpha}$$

Empirical Model

The empirical distribution of ERCs is estimated using an abnormal returns model. The slope coefficient from a regression of abnormal stock returns on unexpected earnings is used to estimate the ERC. The estimation method for ERC conditions unexpected earnings on the market's expectations of earnings immediately before the earnings announcement to abnormal returns immediately around the earnings announcement. Following Easton and Zmijewski (1989) the distribution of ERCs for a sample of firms is estimated with an abnormal returns model with a two-day holding period.

$$CPE(-1, 0)_{jt} = \lambda_{j0} + \lambda_{j1}[FE_{jt}/P_{jt-2}] + \lambda_{j2}RVL_{jt} + \mu_{jt},$$

where

$CPE(-1, 0)_{jt}$ .....sum of the market model" prediction errors over the interval from trading day –1 through the earnings announcement day, day 0 for firm *j* for quarter *t*

FE_{jt} .....earnings announced in quarter t minus the most recent analyst forecast for quarter t earnings,

P_{jt-2} .....price of security *j* on day t-2 (2 days before day zero),

RVL_{jt} .....stock return for firm *j* from the day after the forecast date through two days before the earnings announcement,

$\lambda_{j0}, \lambda_{j1}, \lambda_{j2}$ .....firm-specific regression coefficients

μ_{jt} .....normally distributed disturbance terms.

We first use a generic estimator first to find the co-efficient of the regressors and then proceed to find the impact of fixed effects (FE) and random effects (RE) in the cross sections. We can test whether a fixed or random effects model is appropriate using a Hausman test where and as instruments yields a consistent estimate.

$H_0 : \alpha_i \perp X_{it}, Z_{it}$; $H_a : \alpha_i \perp X_{it}, Z_{it}$; If H_0 is true, both $\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$ are consistent, but only $\hat{\beta}_{RE}$ is efficient. If H_a is true, $\hat{\beta}_{RE}$ is consistent and $\hat{\beta}_{FE}$ is not.

We examine how the firms differ in their investment sensitivity in cases where there share prices are responsive and also in cases where there are unresponsive to earning news. We use K-means clustering to make clusters of firms with high ERC and firms with low ERC and run a regression to check the effect of ERC on firm's investment sensitivity. The dependent variable for the same is gross investment which is given by annual increase in gross fixed assets scaled by beginning-of-year total assets and the independent variable is given by sales growth which is a measure of investment opportunity.

III: *Industry Level ERC*

Industrial Sector	Estimated ERC
FMCG	+7.16
Banking	–0.15
Housing Finance	–0.43
Engineering	+1.24
Information Technology	+1.08
Cement	–21.61
Construction	–1.64
Capital Goods	–2.23
Power	+1.09
Automobiles	–11.52
Manufacturing	+21.00

RESULTS

We first run a panel regression to estimate the Earning Response Coefficients with fixed effects and random effects (Tab. II). In order to proceed for selection between the fixed and random effects we use the Hausman (1968) test specifications. For the computed Hausman statistic, the *p-value* for the test is more than 1%, indicating that the fixed effects model is not appropriate and that the random effects specification is to be preferred (Tab. I). We therefore use random effects model in our analysis.

Earning Response Coefficients, as per the random effects model shown in Table I indicates that the regression coefficients for the entire panel of data comes to –0.177636 and –0.172734 indicating that *the surpise in accounting earnings announcements is negatively associated with abnormal stock returns.* The findings are not consistent with Easton and Zimvejki who report a positive ERC of 1.649 in their study.

We further run a cross sectional regression to find Industry level ERC (Tab. III) to make clusters of firms with high level and low level ERC to further check on the difference in their investment sensitivity.

The results as reported in Tab. III show that the ERC's vary cross sectionally. Out of the eleven industries studied, 5 industries show a positive ERC indicating that there is a positive association between unexpected earnings and abnormal stock returns. But 55% of the firms that is firms in 6 industries show a negative response of stock prices to accounting earnings announcements. The highest positive value observed for manufacturing sector and equivalent highest negative value for cement. A further exploration shows that management style and constitution is possibly responsible for this behaviour. From the individual ERC's we make two clusters, one that have had a positive response to the earnings announcements and the second that have had a negative response to the earning announcements. On these two clusters we run a regression with the dependent variable as gross investment over lagged assets and the independent variable being investment opportunity defined as sales growth (Asker, Mensa and Ljungqvist, 2012).

Tab. IV indicates the implied investment sensitivities. In positive ERC industries the investment sensitivity is –0.080 and for negative ERC industries the coefficient is –0.442, *showing that the investment decisions taken by the firms are negatively sensitive to changes in investment opportunities.* The

I: *Hausman Stattistics for Fixed and Random Effects*

Correlated Random Effects – Hausman Test Test cross-section and period random effects			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	0.616491	1	0.4324
Period random	0.288349	1	0.5913
Cross-section and period random	1.060335	1	0.3031
.Cross-section random effects test comparisons:			
Variable	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
SURPRISE_RATIO	0.058798	–0.172734	0.086955	0.4324

II: *Panel Regression Coefficients-Fixed and Random*

Estimated Variable	Fixed Effects Coefficient	Random Effects Coefficient	Cross Section and time-series Random Effects Coefficient
ERC	0.050496	–0.177636	–0.172734

IV: *Investment Sensitivities*

Effect	Cluster 1-Positive Response (5 Industries)	Cluster 2- Negative Response (6 Industries)
Coefficient	–0.080	–0.442
Standard Error	0.286	0.166

difference between the two coefficients is –0.362 showing that investment sensitivity is greater in negative ERC industries indicating that *negative earning surprises highly influences public firm managers for taking investment decisions*.

REMARKS

Our paper shows a cross sectional variation in ERC'S i.e. the information content of accounting earnings varies across firms. We find that for firms for which stock prices are inversely sensitive to earning news are highly negatively responsive to changes in investment opportunities as compared to firms that have a positive earning surprise – stock price relationship. The difference in the investment sensitivity for the two clusters of firms indicates that the sensitivity and responsiveness of share prices to earning news does have an influence in shaping the investment decisions of the firm. In our study, we use the most recent analyst forecast of earnings as a proxy for the market's expectation of earnings, there could be a measurement error problem in the ERC model as these forecasts may be reported before day – 1. As the exact date on which the forecast is made is not reported the measurement error could not be controlled. To conclude, the investment sensitivity varies across Indian firms and industries, which may affect the corresponding, decision-making behaviours of investors and managers.

REFERENCES

ARIFF MOHAMED and CHENG FAN FAH, 2011: Accounting earnings response coefficient: An extension to banking shares in Asia Pacific countries, *Advances in Accounting*, 27, 2: 346–354. ISSN 08826110.

ASKER, J., FARRE-MENSA, J, LJUNGQVIST, A., 2012: Comparing the investment behaviour of public and private firms, New York University working paper. Available online: http://www.ssrn.com.

BAKER, M., 2000: Career concerns and staged investment: evidence from the venture capital industry, Working Paper Harvard University, MA. Available online: http://www.people.hbs.edu/mbaker/cv/papers/Syndication.pdf.

BALL, R. and BROWN, P., 1968: An empirical evaluation of accounting income numbers, *Journal of Accounting Research*, 6, 2: 159–178. ISSN 1475-679X.

BEAVER, W. H., 1968: The information content of annual earnings announcements, *Journal of Accounting Research,* 6 (Supplement): 67–92. ISSN 1475-679X.

BEBCHUK, L. A., and LARS, A. S., 1993: Do short-term objectives lead to under- or over investment in long-term projects?, *Journal of Finance*, 48, 2: 719–729. ISSN 1540-6261.

BHOJRAJ, S., PAUL, H, PICCONI. M. and MCINNIS, J., 2009: Making sense of cents: An examination of firms that marginally miss or beat analyst forecasts, *Journal of Finance*, 64, 5: 2361–2388. ISSN 1540-6261.

CHAMBERS, D. J., FREEMAN, R. N. and KOCH, A. S., 2005: The Effect of Risk on Price Responses to Unexpected Earnings. *Journal of Accounting, Auditing & Finance*, 20, 4: 461–482. ISSN 0148-558X.

CLEARY, S. 1999: The Relationship between Firm Investment and Financial Status, *The Journal of Finance*, 54, 2: 673–692. ISSN 1540-6261.

COLLINS, D. W. and KOTHARI, S. P., 1989: An Analysis of Intertemporal and Cross-Sectional Determinants of Earnings Response Coefficients, *Journal of Accounting & Economics*, 11, 2–3: 143–181. ISSN 0165-4101.

EASTON, P. D. and ZMIJEWSKI, M. E., 1989: Cross-sectional variation in the stock market response to accounting earnings announcements, *Journal of Accounting and Economics*, 11, 2–3: 117–141. ISSN 0165-4101.

FREEMAN, R. and SENYO TSE, 1992: A Non-linear Model of Security Price Responses to Unexpected Earnings, *Journal of Accounting Research*, 30, 2: 85–209. ISSN1475-679X.

GOMPERS, P. A., 1996: Grandstanding in the venture capital industry, *Journal of Financial Economics*, 42: 133–156. ISSN 0304405X.

GRAHAM, J. R., CAMPBELL, R. H. and RAJGOPAL, S., 2005: The economic implications of corporate financial reporting, *Journal of Accounting and Economics*, 40, 1–3: 3–73. ISSN 0165-4101.

HOTCHKISS, E. S. and STRICKLAND, D., 2003: Does Shareholder Composition Matter? Evidence from the Market Reaction to Corporate Earnings Announcements, *Journal of Finance*, 58, 4: 1469–1498. ISSN 1540-6261.

KAPLAN, S. and ZINGALES, L., 1997: Do Financing Constraints Explain Why Investment is Correlated With Cash Flow? Quarterly *Journal of Economics*, 112, 1: 168–216. ISSN 1531-4650.

KORMENDI, R. and LIPE, R., 1987: Earnings Innovations, Earnings Persistence, and Stock Returns, *Journal of Business*, 60, 3: 323–345. ISSN 0148-2963.

PAWLINA, G. and RENNEBOOG, L., 2005: Is investment-cash flow sensitivity caused by agency costs or asymmetric information? Evidence from the UK, *European Financial Management*, 11, 4: 483–513. ISSN 1468-036X.

STEIN, J. C., 1989: Efficient capital markets, inefficient firms: A model of myopic corporate Behaviour, *Quarterly Journal of Economics*, 104, 4: 655–669. ISSN 1531-4650.

TEOH SIEW HONG and WONG, T. J., 1993: Perceived Auditor Quality and the Earnings Response Coefficient, *The Accounting Review*, 68, 2: 346–366. ISSN 1558-7967.

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