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**Article**

## Predictability of earnings and its impact on stock returns: Evidence from India

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## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# Predictability of earnings and its impact on stock returns: Evidence from India

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**Abstract:** The purpose of this paper is to analyse the predictability of earnings information before the quarterly disclosure date. Two categories of firms are contrasted: the firms that announce better quarterly earnings than the prior period and the firms that do not. The paper uses a sample of 67 large-cap Indian stocks over 33 quarters from 2010 to 2018. Panel data estimation with fixed and random effects is applied to examine the impact of quarterly earnings announcements on stock returns. Results show that all stocks experience return premiums in the pre-announcement period, which is already documented in the literature. The paper adds to the literature by finding that the firms that report better earnings numbers than the previous period generate significantly higher stock returns. It is inferred that the market can anticipate whether the firm will announce better earnings than the prior period. The paper shows that changes in revenue and core earnings are better anticipated. Post-announcement, stock prices adjust to reflect the disclosed

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Aditya Banerjee

### PUBLIC INTEREST STATEMENT

This paper studies whether investors can anticipate the earnings information before the quarterly disclosure date. Existing studies show that before the earnings are announced, market makers act to increase stocks' prices. This paper contrasts the performances of two categories of Indian firms around disclosure: the firms that announce better quarterly earnings than the prior period and the firms that do not. Results show that although all stocks experience higher returns in the pre-announcement period, the firms that report better earnings generate significantly higher stock returns. Thus, it is found that investors can anticipate whether the firm will announce better earnings, especially changes in revenue and core earnings. Post-announcement, stock prices adjust to reflect the disclosed earnings information, and only non-performers experience a drop in stock prices. The findings may allow traders and investors to implement viable entry and exit strategies.

earnings information, and only non-performers experience a drop in stock prices. It is the first comprehensive study of liquid large-cap Indian stocks that provides evidence on the behaviour of stock returns around earnings announcements.

**Subjects:** Finance; Corporate Finance; Investment & Securities; Business, Management and Accounting; Financial Statement Analysis

**Keywords:** Quarterly disclosure; earnings announcements; predictability of earnings; information leakage; return premium; Indian stock market

**Subjects:** G10; G11; G12; G14

## 1. Introduction

Managers convey their efficacy in meeting investor expectation through disclosure events such as earnings announcements. The most regular earnings announcements are quarterly financial results that allow investors to revise their valuation of the firms' equity. Impact of quarterly earnings announcements on stock prices has been thoroughly discussed in the literature (Ball & Shivakumar, 2008; Beaver et al., 2018; Collins et al., 2009; Johnson & So, 2018; Landsman & Maydew, 2002). However, new insights into the investors' collective behaviour and its impact on valuation are revealed with every new finding.

A few instances in the context of Indian companies from the third quarter of the financial year 2018–2019 that motivated this study are presented. Godrej Consumer Products stock price dropped 7% after a weak earnings announcement. HDFC's profit fell 14% sequentially (from the previous quarter) and 63% year-on-year resulting in a 1.03% drop in the share price. Maruti Suzuki India share prices crashed almost 9% intraday on 26 October 2018, after a sharp dip in the third-quarter earnings. On the other hand, ICICI Bank shares were up over 4% even before its December quarter results were declared due to positive analyst expectations. In the case of Jubilant Food Works, the operator of Domino's Pizza in India, stock prices increased nearly 6% before the announcement due to optimistic analyst and brokerage house expectation about steady sales and profit. The prices dropped to the levels observed a month ago as the announcement date approached, only to rise 10% in the following one month after the announcement. Thus, it is evident that the earnings announcements play an instrumental role in the movement of prices.

The exploration of holding period returns before and after the day of announcements (Refer to [Figure 3](#): panels A to D) leads to the argument that earnings information leaks before an announcement (Lakhal, 2008) through industry and sales reports, news, analyst forecasts, and dividend announcements. Investors, based on available information, in an environment of high information asymmetry, buy more stocks of the firms that are expected to announce favourable earnings. Thus, while all firms, irrespective of their disclosed results, enjoy positive returns before the announcement date,<sup>1</sup> the predictability of earnings information results in significantly better returns for the firms that would disclose higher earnings than that of the previous quarter. It warrants an in-depth analysis.

In this paper, panel data regression-based analysis is performed to investigate the impact of quarterly announcements on stock returns. The method is a departure from the traditional event study methodology. The advantage of using panel data over traditional event study is that there is no need to aggregate or average the stock returns of a group of firms. Thus, the effect of announcements on each firm in the sample is accounted for separately. This paper reveals that the stock prices of two categories of firms (that report good or bad results) exhibit significantly distinct behaviour in both pre and post-announcement periods.

In this paper, four earnings variables are considered as explanatory variables that measure the impact of “quarterly disclosure”. They are sales revenue (REV), profit before depreciation, interest, and tax (PBDIT), earnings only from firm operations (EFFECTO, calculated as PBDIT net of other incomes), and profit after tax (PAT). Here REV is a “top-line” figure, and PAT is a “bottom-line” figure. Further, the variables PBDIT, EFFECTO, and PAT are used as measures of profitability. At first, the stock market’s reaction to the “direction” of change in earnings variables is analysed using dummy variables that segregate positive and negative changes in earnings as reported in quarterly financial results (compared to immediately preceding quarter). Then, the analysis of how investors react to the percentage and scaled rupee changes (change in earnings scaled by average revenue) in these four variables is carried out. Finally, the above two analyses are repeated for year-on-year change in quarterly earnings to determine whether the market reacts differently to immediate quarter-to-quarter changes versus changes over a year.

This paper uncovers several interlinked ways in which stock prices react to quarterly announcements. First, there is a positive bias as explained by Johnson and So (2018) in prices leading to the day of disclosure, irrespective of whether the firm later discloses positive or negative result. However, the results of this study highlight that the positive bias is significantly more for firms that report better earnings, providing evidence for the argument that earnings numbers are predicted, to some extent, by the investors at large. Second, the direction of change in earnings is more important in explaining the returns than the percentage or the rupee change in earnings. Third, concurrent with the findings of Johnson and So (2018), results of this study reveal that firms with lower earnings subsequently experience a reversal in their prices. However, the paper additionally finds that firms with better earnings continue to earn higher returns for at least a month. Fourth, market reaction to the year-on-year direction of change in PBDIT, EFFECTO, and PAT is more significant than the reaction to the direction of change in these variables on a quarter-to-quarter basis. Fifth, investors pay much attention to the earnings from core operations (Fan et al., 2010), which is proxied by EFFECTO in this study. Since EFFECTO is free from other incomes that may be subject to manipulations, quarterly and year-on-year change in EFFECTO significantly impacts stock returns.

This paper does not measure the extent of information leakage. However, the results suggest some form of information leakage in the Indian market, conforming to the findings of prior studies (Chauhan et al., 2016; Jain & Sunderman, 2014). Besides providing evidence about information leakage and earnings predictability, this paper also exhibits that the information asymmetry and noise in the market last for weeks pre and post an announcement, rather than just a few days around the announcement date. Last but not least, this is the first comprehensive study of Indian liquid large-cap stocks around quarterly announcement date using multi-period data that reveals the existence of a significant impact of earnings announcements on stock returns.

The remainder of the paper is structured as follows: Section 2 presents a review of the relevant literature and describes the formulation of hypotheses. Section 3 describes the data and methodology adopted in the study. The results of the analysis and the rationale behind the results are discussed in section 4. Section 5 concludes the work by discussing contributions and future research avenues.

## **2. Review of literature, theoretical background, and hypotheses**

### **2.1. Review of literature**

Recent literature on the impact of earnings announcements on stock returns reveals four major threads. First, intermediaries<sup>2</sup> who intend to cut down their inventories before announcements induce buy demands, leading to stocks trading overpriced in the vicinity of the day of an announcement that corrects itself after the announcement (Johnson & So, 2018). Second, firms

that are known to make announcements earlier than other firms have more risk and therefore earn a higher risk premium, implying that the timing of the announcement is essential (Savor & Wilson, 2016). Third, investors earn most of their premium before announcements due to uncertainty regarding earnings, which leads to increased price volatility before the announcement period (Barber et al., 2013). Fourth, asymmetric information increases in the pre-announcement period, indicating leakage of information (Krinsky & Lee, 1996; Lakhali, 2008). It is evident from these threads of literature that earnings announcements are worth examining as they are important and predictable motivators of the stock prices.

Quarterly financial announcements are important for both managers of firms and investors as they provide the details of firms' financial performance during the quarter. Balakrishnan et al. (2014) explained that retail investors react to any voluntary disclosure made by the firm. This reaction induces liquidity in the firm's stocks and eventually leads to higher firm value. Similarly, managers tend to avoid missing analyst forecasts, as L. D. Brown and Caylor (2005) explained.

Earnings announcements are among the most significant disclosure events, and several researchers have studied its impact on stocks. A study by Landsman and Maydew (2002) reveals that earnings information has become even more critical and informative over the years, and its impact on abnormal stock returns has increased over time. On the other hand, Ball and Shivakumar (2008) find that though quarterly announcements are foremost information providers, their impact on returns is below expectation. They contribute a maximum of 1–2% to the abnormal return volatility.

Collins et al. (2009) postulate that the real reason behind the increase in the importance of earnings announcements is due to increase in popularity of certain kinds of informal earnings announcements (such as Street earnings) among investors. They infer that such announcements have a more significant impact on the market nowadays. DellaVigna and Pollet (2009) show that investors differ in their sentiment towards earnings announcements based on the day of such announcements. For example, they pay much less attention to earnings announcements if those announcements are made on a Friday. Cready and Gurun (2010) reveal that earnings announcements may not immediately reflect in market prices and are gradually assimilated. Deshpande and Svetina (2011) use data on publicly traded firms headquartered in the San Diego County, USA, to reveal that investors tend to pay more attention to local news about local firms when it comes to news about earnings surprises. Beaver et al. (2018) use event study to analyse US firms, revealing the growing importance of earnings information over time, which is especially true for large companies with positive earnings announcements.

The event study is a preferred methodology for studying the impact of financial and other events on stock market movements. The event study methodology was proposed by Fama et al. (1969) and subsequently improved upon and applied to study various other events that affected stock prices (Brown & Warner, 1980, 1985; Chandra & Balachandran, 1992; Gonedes, 1973; Mandelker, 1974). Several papers apply event study for examining different types of events, e.g., the impact of isolated stock market events (Kirilenko et al., 2017) such as the "Flash Crash" of 2010, the impact of banking sector regulations (Bruno et al., 2018), and the reaction of stock price to major cross-national events such as the recent Brexit (Ramiah et al., 2017).

In the Indian context, Das et al. (2014) use an event study to analyse the impact of quarterly disclosure on stock returns. Their study using a sample of 30 firms from the Bombay Stock Exchange's (BSE) benchmark index SENSEX reveals no impact of quarterly announcements on stock returns in either boom or recessionary market conditions. However, since Das et al. (2014) take the average of firms' stock returns after dividing them according to "good" and "bad"

earnings, the information contained in individual firms' stock returns is lost. However, Gupta (2006), who analysed March 2004 quarterly announcement data for S&P CNX NIFTY stocks, finds a positive average abnormal return (AAR) on announcement days for stocks with good news and a negative AAR for stocks with bad news.

Indian stock markets show recorded evidence of information leakage before events such as earnings announcements, corporate actions, mergers and acquisitions, etc. For example, Jain and Sunderman (2014) study stock prices in India around mergers and acquisition announcements for 831 firms between 1996 and 2010. They found a significant abnormal return (over market return) before the actual event suggesting leakage of information prior to announcements. Chauhan et al. (2016) study a sample of 795 firms that have engaged in insider trading from 2007 to 2012. They analyse univariate stock prices to compute cumulative average abnormal returns (CAARs) of Indian stocks with insider trades. They found that insider purchases lead to positive abnormal CAAR and vice versa before announcements, and buy trades by insiders is more informative before earnings announcements. Their results also suggest the existence of information asymmetry in the Indian stock markets around the announcement period.

### 2.2. Theoretical background and hypotheses

First, this sub-section presents a two-period theoretical model that demonstrates the rationale of why an investor would buy more stocks of the firms that are expected to announce favourable earnings. Then, based on the model, the hypotheses are constructed.

Let the investor hold  $q$  number of stocks at price  $x$  and an initial inventory of cash  $M$  before the announcement (first period). If the investor follows a naïve strategy (N) of holding on to the stocks and the cash, then the value of her holdings after the announcement (second period) can be expressed as:

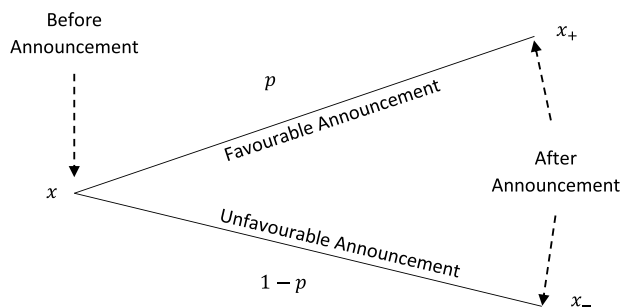
$$E(V_N) = px_+q + (1 - p)x_-q + M \tag{1}$$

where  $x_+$  and  $x_-$  represent the price of the stocks after announcement due to positive and negative information (announcements), respectively.  $p$  and  $(1 - p)$  signify the probability of positive and negative announcements, respectively (refer to Figure 1).

However, if the investor feels that the price of the security will increase due to some favourable announcement, then she will opt for an active trading strategy (A) through buying an additional

**Figure 1. A two-period case with an earnings announcement.**

Note: This figure shows a two-period case where the price of a stock before the announcement (first period) is  $x$ . The probability that the stock price will go up to  $x_+$  following an announcement (second period) is  $p$  and consequently probability that price will drop to  $x_-$  is  $(1-p)$ .





quantity of the security (denoted by  $\delta$ ) in the first period at price  $x$ . Hence, her value of holdings in the second period can be written as

$$E(V_A) = px_+(q + \delta) + (1 - p)x_-(q + \delta) + [M - x\delta] \quad (2)$$

Algebraic manipulation of Equation 1) and (Equation 2), yields the following result:

$$E(V_A) - E(V_N) = \delta\{p(x_+ - x_-) - (x - x_-)\} \quad (3)$$

Therefore, the active strategy performs better than the naïve strategy only if the following condition is satisfied.

$$E(V_A) - E(V_N) \geq 0 \text{ iff } p(x_+ - x_-) \geq (x - x_-) \quad (4)$$

Hence, the threshold probability for selecting an active strategy over a naïve strategy is

$$p^* \geq \frac{x - x_-}{x_+ - x_-} \quad (5)$$

Johnson and So (2018) opine that market makers and dealers try to manipulate the market to minimise their loss ( $x - x_-$ ) in case of a negative announcement. It results in a lower value of ( $x - x_-$ ). The price after the announcement ( $x_+$  or  $x_-$ ) is a function of REV, EFFO, PBDIT, and PAT along with their expected growth rates.<sup>3</sup> If the expected earnings for the current period are higher than the prior period, the expected growth rate of Cash Flow (CF) from the asset increases, implying a higher price ( $x_+$ ) after the announcement. Thus, an investor will be willing to adopt an active strategy at a lower threshold probability ( $p^*$ ) if the expected value of  $x_+$  is high.

Investors may estimate whether the announcement will be positive or negative from various sources such as industry and sales reports, news, analyst forecasts, dividend announcements, and so on (L. D. Brown & Caylor, 2005; Johnson & So, 2018; Savor & Wilson, 2016). Investors will thus have a speculated probability of positive results ( $p$ ) about a firm. They will select an active trading strategy if their speculated probability is higher than the threshold ( $p > p^*$ ).

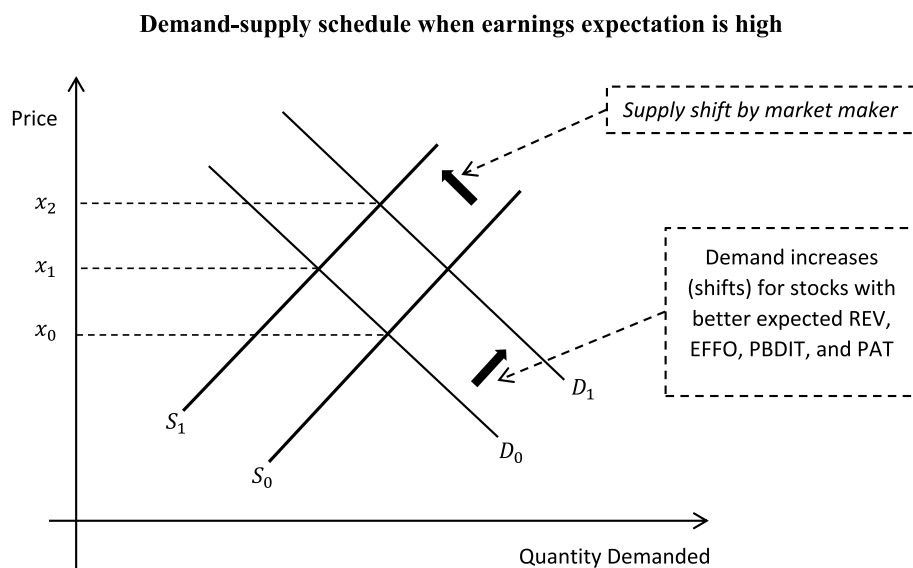
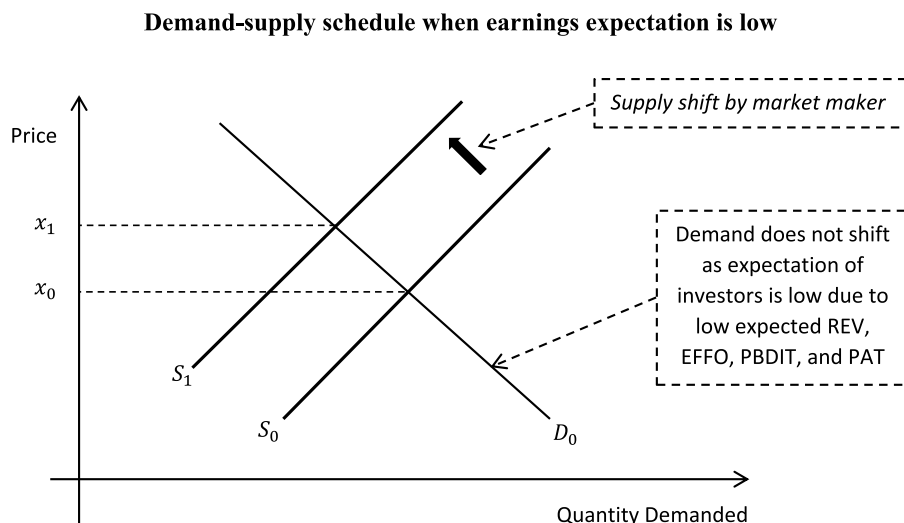
Thus, based on the above discussion, two different behaviours may emerge for two different categories of stocks. The demand for the stocks where there is an anticipation of bad results will not increase significantly while the action of market makers will constrict the supply of stocks. It leads to a smaller price increase, as depicted in Figure 2: panel A. On the other hand, the demand for the stocks with a higher speculated probability of good results would rise due to an increase in the number of investors preferring active strategy. In a similar fashion with the previous case, the supply of stocks will remain constricted. Thus, the demand-supply mechanism of the stocks, depicted in Figure 2: panel B, results in a more substantial increase in price before the announcement for the stocks that would report favourable earnings.

Therefore, the first hypothesis is:

H1: The firms that would report higher earnings than the previous quarter (or same quarter in the previous year) earn a higher stock return in the pre-announcement period, compared to those firms that would report lower earnings than the previous quarter (or same quarter in the previous year).



**Figure 2. (Panel A) Demand—supply schedule when earnings expectation is low. (Panel B) Demand—supply schedule when earnings expectation is high.**



Since the investors decide in an environment of high information asymmetry, predicting the percentage or scaled rupee change in earnings is more complicated and erroneous than the projection of a simple increase or decrease in earnings. Hence, the second hypothesis is:

H2: Direction of change (increase or decrease) of earnings variables is more significant than the percentage or scaled rupee change in earnings variables in determining the stock returns around earnings announcements.

Earlier researchers (Ahmad et al., 2006; Dicle et al., 2010) suggest that Indian stock markets have very low efficiency and may not even be weakly efficient. However, in a later study, Mobarek and Fiorante (2014) show that the Indian stock market is weakly efficient. On similar lines, Mishra et al. (2015) suggest that Indian stock markets may be mean-reverting, a finding corroborated by Ahmed et al. (2018). Given the low efficiency in the Indian stock market, investors only react to predicted earnings information in an environment of high information asymmetry in the pre-announcement period. Due to market inefficiency and demand creation by market makers, market makers prices go up in the pre-announcement period, even for the stocks that would report inferior results (Johnson & So, 2018). However, post-announcement the stock prices revert to new equilibriums that reflect the recently published earnings information. Therefore, the two categories of stocks that report good or bad results will exhibit different price behaviour in the post-announcement period. Thus, the third and final hypothesis can be stated as below:

H3: Stock prices (and returns) diverge after the announcement for firms that report higher earnings than the previous quarter (or same quarter in the previous year) vs the firms that report lower earnings than the previous quarter (or same quarter in the previous year).

### 3. Sample, data and methodology

This study's sample includes all quarterly earnings disclosures made from March 2010 to March 2018 by the firms listed in BSE and included in S&P BSE100<sup>4</sup> as on 28 September 2018. Small-cap and mid-cap stocks are not included in the study since they lack liquidity in the Indian markets. The lack of liquidity may affect how information is reflected in stock prices (Engelberg et al., 2018). Further, Iqbal and Santhakumar (2018) noted that the larger the size of the Indian firms, lower is the extent of information asymmetry and insider trade profitability. Thus, the study focuses on large-cap liquid stocks in the Indian markets.

#### 3.1. Data

Quarterly financial data for S&P BSE 100 stocks for the sample period is collected from the PROWESS database of the Centre for Monitoring Indian Economy (CMIE). Data on quarterly announcement dates are collected from the Bombay Stock Exchange (BSE) website. The daily stock prices and index data are also collected from CMIE PROWESS Database<sup>5</sup> for the period of 4 January 2010–28 September 2018, to accommodate for late announcements of quarterly results.

From the initial sample of all 100 companies in the BSE 100 index as on 28 September 2018, financial services and banking companies<sup>6</sup> are removed. Subsequently, companies with missing quarterly financial data or announcement dates are also removed. The final sample thus obtained consists of a balanced panel data of 67 companies listed under the BSE 100 index from March 2010 (Q1 2010) to March 2018 (Q1 2018), which amounts to 33 quarterly periods in total, and 32 periods considering the change from quarter-to-quarter, resulting in observations for 2,144 firm-quarters.

#### 3.2. Methodology

This study's dependent variable is the annualised daily stock returns for certain periods before and after the quarterly financial reports' announcement date. The periods considered are 5, 10, 15, 20, and 25 trading days. Information asymmetry and assimilation of reported disclosure happen in both pre- and post-announcement period, respectively. Thus, up to 25 trading days on either side of the announcement date is considered for the study, equivalent to 5 weeks, assuming an average of five trading days in a week.

For all the firms in the final sample, an annualised logarithmic holding period return (HPR, denoted by  $SR_{t\pm n,i}$ ) is computed for all the above days using equations (Equation 1) and Equation 2:

$$SR_{t-n,i} = \ln\left(\frac{P_t}{P_{t-n}}\right) \times \frac{250}{n} \quad (1)$$

$$SR_{t+n,i} = \ln\left(\frac{P_{t+n}}{P_t}\right) \times \frac{250}{n} \quad (2)$$

where  $P_t$  is the stock price on the announcement date also called the “zero-day” (or the trading date immediately after announcement date if the announcement date is a non-trading day) signifying the announcement date.  $P_{t\pm n}$  are stock prices for  $n$  trading days after or before the announcement date ( $n = 5, 10, 15, 20,$  and  $25$  days for 10 distinct cases as mentioned above), and  $i$  is an index of firms in the sample. Annualised returns (assuming 250-trading days per year) are used to ensure that results are comparable. BSE 100 index holding period return is the proxy for Market Returns (MR).  $MR_{t\pm n}$  is calculated using index prices using the same methodology as in Equation 1 and Equation 2. Including MR helps in controlling for the effect of systematic risk in stock returns.

REV ( $j = 1$ ):	It is Sales Revenue (REV) of the quarter.
PBDIT ( $j = 2$ ):	It is the quarterly Profit before Depreciation, Interest, and Tax.
EFFO ( $j = 3$ ):	It is PBDIT less other income (OI), and this variable is termed Earnings from Firm Operations (EFFO). It is a measure of earnings from core operations of firms (McVay, 2006; Fan et al., 2010).
PAT ( $j = 4$ ):	It is the quarterly Profit After Tax.

The first step of this study is to analyse how investors react to the change in the direction of earnings (by using a dummy variable for positive change) in the pre-announcement period and the post-announcement period. Thus, at first, the change relative to the immediately preceding quarter ( $Q_{t-1}$ ) is computed. A formal representation of the regression model used for this analysis is below:

$$SR_{t\pm n,i} = \alpha + \beta_{MR} \cdot MR_{t\pm n} + \gamma_j D_{t,i}^j + \varepsilon_{t\pm n,i} \quad (3)$$

where  $SR_{t\pm n,i}$  is the pre- or post-announcement day return of the  $i$ th stock from the announcement date  $t$  for  $n$  days ( $n = 5, 10, 15, 20,$  and  $25$  days).  $\alpha_i$  is the constant and  $\beta_{MR}$  is the coefficient of the index return  $MR_{t\pm n}$  for the same period as individual stock returns, and  $\varepsilon_{t\pm n,i}$  is the overall regression error component.  $\gamma_j$  (where  $1 \leq j \leq 4$ ) is the coefficient for  $j$ -th “Sentiment dummy” ( $D_{t,i}^j$ ) each pertaining to one of the explanatory variables as defined below:

For each variable defined above,  $D_{t,i}^j = 1$ ,  $j = 1$  to  $4$  if its current quarter value is higher than that of the previous quarter, else  $D_{t,i}^j = 0$ ,  $j = 1$  to  $4$ .

In the second step, analysis of how investors price stocks in the pre-announcement and the post-announcement periods is carried out using the change in earnings as explanatory variables, and the market return as the control variable. In the case of REV, the “percentage change” in REV from the prior period is calculated. The values of PBDIT, EFFO, and PAT can be either positive or negative. Hence, the percentage change is meaningless. Thus, the change in the value of those variables over the prior period ( $\Delta PBDIT$ ,  $\Delta EFFO$ , and  $\Delta PAT$ ) are scaled by the average REV (average of  $REV_t$  and  $REV_{t-1}$ ) of the period.<sup>7</sup> They are referred to as the “scaled rupee change” in those variables.

The formal representation of regression equations for stock returns after and before the announcement is below:

$$SR_{t\pm n,i} = \alpha + \beta_{RM}.RM_{t\pm n} + \delta_j X_{t,j}^i + \vartheta_{t\pm n,i} \quad (4)$$

where  $\delta_j$  is the coefficient for the percentage or rupee change in the values of the  $j$ th explanatory variable described earlier. The change in each explanatory variable over its previous quarter value is  $X_{t,j}^i$ . The overall error component is denoted by  $\vartheta_{t\pm n,i}$ .

Some previous studies (Ball & Kothari, 1991; L. D. Brown & Caylor, 2005) examined if investors react differently to changes in quarterly results over the same quarter in the immediately preceding year. In similar logic, “dummy” and “percentage” or “scaled rupee change” variables are constructed in the same way as described above by considering the year-on-year changes in earnings variables (REV, PBDIT, EFFO, and PAT) over the same quarter previous year ( $Q_t$  over  $Q_{t-4}$ ). Equation 3 and Equation 4 are re-estimated by regressing year-on-year explanatory variables on the pre and post-announcement stock returns. The year-on-year study also acts as a robustness test in the study and removes any effect of seasonality that would bias the quarter-to-quarter results. The panel data consists of 2,144 firm-quarter observations for all the variables for the quarter-to-quarter observations. For the year-on-year study, there are 29 quarters and 1,943 firm-quarter observations.

Traditional event study method requires the computation of abnormal returns using a historical beta value. In the panel data model employed in this paper, historical abnormal returns are not computed. Instead, market returns are controlled for. The benefits of using panel data regression method can be summarised below:

- (1) With panel data, cross-section and period random effects and/or fixed effects are examined. The random/fixed effects specifications help filter out the idiosyncratic stock-specific effect as well as seasonality.<sup>8</sup>
- (2) It is possible to control for market returns, which is a proxy for market-wide sentiment, for each firm’s stock returns in a panel data. Thus, there is no requirement for historical betas for computing abnormal stock returns.

The regression parameters are estimated after testing and controlling for panel data effects. The presence of Fixed Effects is verified with the help of fixed effects redundancy test. The tests use both  $F$  and Chi-square statistic for the null hypothesis that fixed effects are redundant. The presence of Random Effects is verified using the Hausman Test proposed by Hausman (1978). The Hausman test uses a Chi-square statistic for the null hypothesis that random effects are efficient and consistent.<sup>9</sup>

Table 1. Summary statistics				
Variables	Average	Std. Dev.	Count	Percent positive
$(REV_t - REV_{t-1})/REV_{t-1}$	0.0626	0.6948	2144	63%
$(PBDIT_t - PBDIT_{t-1})/0.5 \times (REV_{t-1} + REV_t)$	-0.0015	1.1524	2144	55%
$(EFFO_t - EFFO_{t-1})/0.5 \times (REV_{t-1} + REV_t)$	0.0032	0.1823	2144	55%
$(PAT_t - PAT_{t-1})/0.5 \times (REV_{t-1} + REV_t)$	-0.0041	0.9021	2144	53%

Notes: This table shows the calculation method and descriptive statistics for all variables under study. Count and percent positive indicate the number of sample days for each explanatory variable and number of times a quarter-to-quarter change in that variable was positive.

#### 4. Results and discussion

The summary statistics for all the explanatory variables of interest are available in Table 1. The first column of Table 1 presents the formula used for calculating the variable values. On average, changes in PBDIT and PAT are negative over the years, while that of REV and EFFO are positive. Next, a graphical analysis by segregating firms according to their earnings numbers is presented.

Table 2 shows average periodic stock (panel A) and market (panel B) returns of all firms consolidated for the periods before and after quarterly announcements. The average stock returns are significant and positive until 2 weeks before an announcement. However, they lose significance after this specified period. Further, the regression of stock returns with market returns of the same period as the control variable strengthens this finding. In a similar fashion, excess stock returns measured by intercept terms ( $\alpha_t$ ) (refer to panel C) remain positive and significant until 2 weeks before announcements and lose their significance after that. Results indicate that an average firm enjoys positive return up to 2 weeks before announcement irrespective of whether it posts positive or negative earnings numbers corroborating the findings of Johnson and So (2018). The periodic market return (Table 2: panel B) is positive and significant up to 2 weeks before announcements but turns significantly negative after that. The results support the insight of Savor and Wilson (2016) that the impact of individual earnings announcement is felt market-wide.

Market return betas (Table 2: panel C) are significant before announcements, suggesting that they are relevant in explaining stock returns. However, they are not significant for 2 weeks after announcements. After that, they become significant again. The result suggests that the idiosyncratic earning numbers play a more critical role than market-wide sentiments in determining stock returns just after announcement dates. It concurs with the findings of Barber et al. (2013).

##### 4.1. Behaviour of stock returns around announcement dates: A graphical analysis

A graphical representation is made to determine the pattern of stock returns before and after the announcements. Firms are segregated in two groups; “performers” (firms with an increase in explanatory earnings variables over the previous quarter) and “non-performers” (firms with a decrease in explanatory earnings variables over the previous quarter). Annualised periodic stock

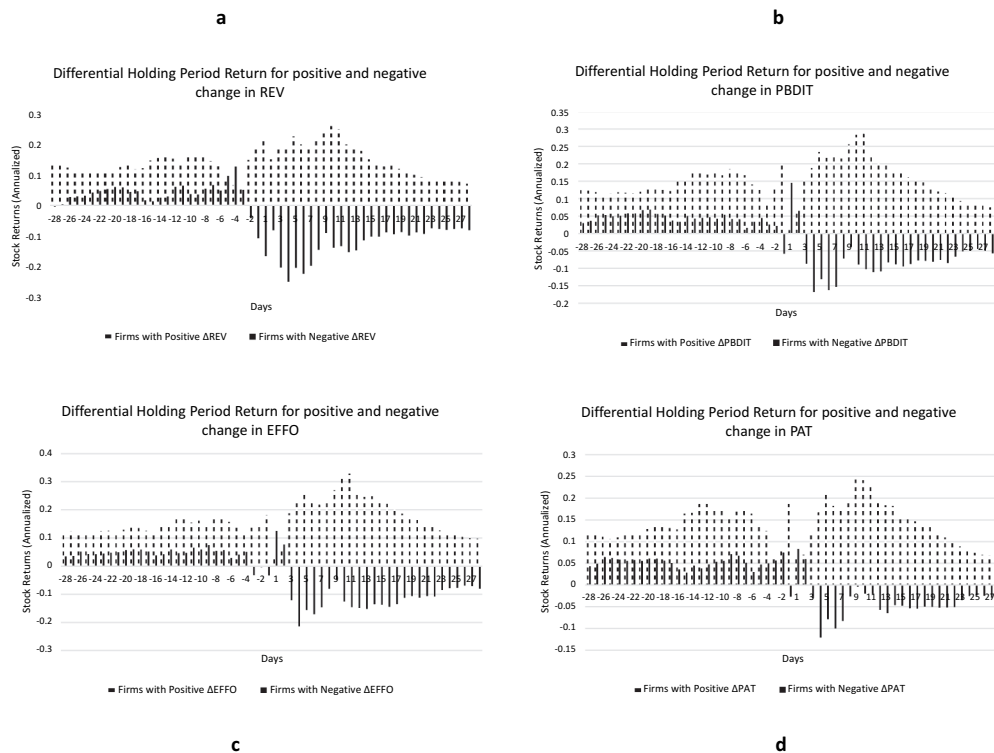
**Table 2. Average stock returns vs market returns and their relationship**

Days	Panel A		Panel B		Panel C				
	$\mu_{SR}$	$\sigma_{SR}$	$\mu_{MR}$	$\sigma_{MR}$	$\alpha$	$\beta_{MR}$	Adj. $R^2$	D-W Stat	F-Stat
-25	0.2397***	0.8565	0.1553***	0.4777	0.1601***	0.5124***	0.1481	2.0556	12.6415***
-20	0.2325***	0.9816	0.1369***	0.5571	0.1678***	0.4727***	0.1460	2.0546	12.4442***
-15	0.2031***	1.1743	0.1057***	0.6649	0.1669***	0.3425***	0.1255	2.0412	10.6108***
-10	0.1570***	1.4634	0.0430**	0.8061	0.1492***	0.1812***	0.1114	1.9964	9.3922***
-5	0.0468	2.0908	-0.0452***	1.0774	0.0575	0.2371***	0.0145	2.0050	32.4339***
+5	-0.5735	2.4968	-0.1246***	1.1842	-0.0567	0.0050	0.0389	2.0588	3.7104***
+10	-0.0237	1.7142	-0.1367***	0.8514	-0.0213	0.0179	0.0762	2.0116	6.5265***
+15	-0.0437	1.3876	-0.1011***	0.6818	-0.0165	0.2686***	0.1207	1.9942	10.1932***
+20	-0.0311	1.1780	-0.0670***	0.5735	-0.0079	0.3457***	0.1501	1.9945	12.8229***
+25	-0.0016	1.0161	-0.0243**	0.4780	0.0116	0.4109***	0.1713	2.0126	14.8411***

Notes: Panel A shows the mean stock return ( $\mu_{SR}$ ) and its standard deviation for all periods. Panel B shows the mean market return ( $\mu_{MR}$ ) and its standard deviation for all periods. Panel C shows the result of panel data regression between stock return (SR) and the market return (MR) for periods before and after the announcement of quarterly results for the equation:  $SR_{t,j} = \alpha + \beta_{MR} MR_{t,j} + \epsilon_{t,j}$ . The symbol “\*\*\*” refers to a significance at 1% level; “\*\*” refers to a significance at 5% level and “\*” refers to a significance at 10% level.

**Figure 3. (Panel A) Differential holding period return around for firms disclosing positive and negative change in revenue.**

Note: This figure shows how average holding period (–t to 0) and (0 to t) stock returns for two different groups of firms differ. The first group comprises firms that report an increase in the REV since last quarter, represented by dashed lines. The second group comprises firms that report a decrease in REV compared to last quarter, represented by bold lines. The holding period stock returns are adjusted for market returns by subtracting BSE100 index holding period returns (of the same periods) from them



returns from the  $n$ th day pre-announcement to the day of the announcement and from the day of the announcement to the  $n$ th day post-announcement are calculated by applying Equations 1 and 2, respectively ( $SR_{t\pm n,i}$ ,  $n = 1$  to 28, where  $i$  is an index of firms). Further, they are adjusted for market movement by subtracting annualised periodic market returns ( $MR_{t\pm n}$ ,  $n = 1$  to 28) for respective periods. The resultant returns are the average abnormal returns (AARs) for the sample stocks during the period. Then, the averages of two groups, i.e., “performers” and “non-performers” are calculated for each periodic return. This procedure is repeated for the four earning variables that are used to segregate “performers” and “non-performers”. A plot of excess stock returns contrasting the “performers” with the “non-performers” is presented for each of the explanatory variables (Figure 3: panels A to D).

An identical pattern emerges from all the plots. Stock returns of the “non-performers” are positive right up to the announcement date when the disclosure happens, and then the stock prices correct.<sup>10</sup> Although all stocks enjoy higher returns in pre-announcement weeks, the “performers” returns are higher than that of the “non-performers” before the announcement. It signifies that the market may have some information about which firms would announce better earnings even before the actual announcement happens. Just after the announcement, stock returns turn negative for the “non-performers”, while they remain positive for the “performers”, showing a divergent pattern.

This finding supports the analysis that leads to hypotheses 1 and 3 of this study (see Figures 1 and 2). Results presented below provide statistical evidence in favour of these hypotheses.

#### 4.2. Regression analysis with the quarter-to-quarter change in earnings variables

Tables 3–6 (panels A and B) show the result of panel data regressions<sup>11</sup> with the quarter-to-quarter changes in variables under study, after controlling for market return (MR). The common

**Table 3. Effect of change in revenue (REV) on stock returns around the announcement date**

Panel A: Dummy variable (D) for REV (quarter-to-quarter)													Panel B: Percentage change in REV (X) (quarter-to-quarter)												
Days	$\alpha$	$\beta_{RM}$	$\gamma_{REV}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta_{RM}$	$\delta_{REV}$	Adj. $R^2$	D-W Stat	F-Stat	Days	$\alpha$	$\beta_{RM}$	$\delta_{REV}$	Adj. $R^2$	D-W Stat	F-Stat						
-25	0.0970***	0.5096***	0.1005***	0.1508	2.0591	12.5312***	0.1615***	0.5136***	-0.0255	0.1481	2.0561	12.2907***	-5	0.0477	0.2372***	0.0154	0.0140	2.0037	16.2536***	0.0608	0.2385***	-0.0522	0.0143	2.0038	16.5491***
-20	0.1216***	0.4715***	0.0733*	0.1468	2.0566	12.1746***	0.1688***	0.4740***	-0.0196	0.1457	2.0551	12.0790***	+5	-0.3379***	0.0172	0.4470***	0.0665	2.1336	2.5418***	-0.0668	0.0091	0.1682**	0.0407	2.0619	3.7531***
-15	0.0739*	0.3447***	0.1467***	0.1286	2.0439	10.5868***	0.1670***	0.3425***	-0.0005	0.1251	2.0410	10.2840***	+10	-0.3029***	0.0197	0.4457***	0.0910	2.0227	7.5018***	-0.0290	0.0230	0.1349***	0.0788	2.0068	6.5568***
-10	0.0588	0.1816***	0.1429**	0.1131	1.9976	9.2820***	0.1481***	0.1808***	0.0186	0.1110	1.9956	9.1090***	+15	-0.2016***	0.2640***	0.2919***	0.1302	1.9964	10.7217***	-0.0215	0.2730***	0.0860**	0.1222	1.9900	10.0386***
-5	0.0762*	0.4981***	0.1005**	0.1356	2.0646	11.1536***	0.1564***	0.4975***	-0.0052	0.1335	2.0621	10.9713***	+20	-0.1512***	0.3483***	0.2268***	0.1578	2.0003	13.1697***	-0.0114	0.3473***	0.0571*	0.1508	1.9930	12.5327***
-20	0.1186**	0.4662***	0.0619	0.1349	2.0666	11.0952***	0.1679***	0.4660***	-0.0028	0.1343	2.0648	11.0430***	+25	-0.0974***	0.4138***	0.1725***	0.1773	2.0188	14.9944***	0.0108	0.4112***	0.0131	0.1710	2.0124	14.3914***
-15	0.0729	0.3440***	0.1235*	0.1213	2.0527	9.9334***	0.1702***	0.3421***	0.0011	0.1196	2.0500	9.7939***	Panel C: Dummy variable (D) for REV (year-on-year)												
-10	0.0904	0.1626***	0.0984	0.1157	2.0544	3.6464***	0.1453***	0.4211***	0.0150	0.0520	2.0246	54.2526***	Panel D: Percentage change in REV (X) (year-on-year)												
-5	0.0022	0.0421	0.0940	0.0678	2.0293	2.4711***	0.0840*	0.0402	-0.0414	0.0682	2.0285	2.4806***	Days	$\alpha$	$\beta$	$\gamma_{REV-t-4}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{REV-t-4}$	Adj. $R^2$	D-W Stat	F-Stat
+5	-0.3104**	0.0042	0.3613**	0.0566	2.1225	2.2133***	-0.0431	-0.0010	0.0879**	0.0354	2.0510	3.3729***	-25	0.0762*	0.4981***	0.1005**	0.1356	2.0646	11.1536***	0.1564***	0.4975***	-0.0052	0.1335	2.0621	10.9713***
+10	-0.2546***	-0.0112	0.3196***	0.0942	2.1048	3.1035***	-0.0090	-0.0088	0.0333	0.0899	2.0982	2.9974***	-20	0.1186**	0.4662***	0.0619	0.1349	2.0666	11.0952***	0.1679***	0.4660***	-0.0028	0.1343	2.0648	11.0430***
+15	-0.0973	0.2636***	0.1272	0.1302	2.0770	4.0279***	0.0042	0.2564***	-0.0106	0.1130	2.0068	9.2444***	-15	0.0729	0.3440***	0.1235*	0.1213	2.0527	9.9334***	0.1702***	0.3421***	0.0011	0.1196	2.0500	9.7939***
+20	-0.0656	0.3625***	0.1006	0.1517	2.0827	4.6185***	0.0135	0.3585***	-0.0007	0.1355	2.0111	11.1482***	-10	0.0904	0.1626***	0.0984	0.1157	2.0544	3.6464***	0.1453***	0.4211***	0.0150	0.0520	2.0246	54.2526***
+25	0.0021	0.4253***	0.0280	0.1706	2.0998	5.1610***	0.0232	0.4157***	0.0038	0.1631	2.0283	13.6166***	-5	0.0022	0.0421	0.0940	0.0678	2.0293	2.4711***	0.0840*	0.0402	-0.0414	0.0682	2.0285	2.4806***

Notes: This table shows the results of panel data regression. The dependent variable is annualized returns before and after (denoted by negative and positive days, respectively) the date of announcement of quarterly financial results. In Panel A, the explanatory variable is the dummy variable for sales revenue (REV), where '1' represents the increase in the REV compared to the previous quarter while '0' represents the decrease in the REV compared to the previous quarter. In Panel B, the explanatory variable is the continuous variable  $X_t$  representing percentage changes of REV over their previous quarter values. In Panel C, the explanatory variable is the dummy signifying increase (1) or decrease (0) in REV year-on-year ( $Q_t$  over  $Q_{t-4}$ ). In Panel D, the explanatory variable is the percentage change in the value of REV year-on-year ( $Q_t$  over  $Q_{t-4}$ ). Market return (MR) is the control variable in all cases. Random Effects and Fixed Effects have been applied (refer to Table 11) as per the case may be with a preference to random-effect model, but the tests and results are not included here for brevity. The symbol "\*\*\*\*" refers to a significance at 1% level; "\*\*\*" refers to a significance at 5% level and "\*\*" refers to a significance at 10% level



**Table 4. Effect of change in profit before depreciation interest and tax (PBDIT) on stock returns around the announcement date**

Panel A: Dummy variable (D) for an increase in PBDIT (quarter-to-quarter)											Panel B: Change in PBDIT (X') by avg. REV (quarter-to-quarter)										
Days	$\alpha$	$\beta$	$\gamma_{PBDIT}$	Adj. R <sup>2</sup>	D-W Stat	F-Stat	$\delta_{PBDIT}$	$\alpha$	$\beta$	$\delta_{PBDIT}$	Adj. R <sup>2</sup>	D-W Stat	F-Stat								
-25	0.1249***	0.5080***	0.0649*	0.1491	2.0592	12.3784***	-0.0069	0.1599***	0.5135***	-0.0069	0.1478	2.0552	12.2603***								
-20	0.1365***	0.4718***	0.0568	0.1464	2.0548	12.1352***	-0.0053	0.1678***	0.4727***	-0.0053	0.1456	2.0549	12.0657***								
-15	0.1057***	0.3447***	0.1102**	0.1273	2.0409	10.4702***	0.0173	0.1670***	0.3422***	0.0173	0.1254	2.0417	10.3112***								
-10	0.0650	0.1806***	0.1523**	0.1136	1.9982	9.3256***	0.0201	0.1492***	0.1811***	0.0201	0.1112	1.9966	9.1265***								
-5	-0.0397	0.2353***	0.1755*	0.0158	2.0030	18.1716***	0.0356	0.0575	0.2362***	0.0356	0.0144	2.0059	16.6126***								
+5	-0.2336***	0.0105	0.3210***	0.0425	2.0615	3.8817***	-0.0213	-0.0569	0.0040	-0.0213	0.0386	2.0597	3.6047***								
+10	-0.2112***	0.0291	0.3461***	0.0858	2.0154	7.0922***	0.0236	-0.0212	0.0180	0.0236	0.0761	2.0119	6.3480***								
+15	-0.1448***	0.2781***	0.2336***	0.1272	1.9956	10.4657***	-0.0125	-0.0166	0.2679***	-0.0125	0.1205	1.9943	9.8933***								
+20	-0.1112***	0.3507***	0.1873***	0.1558	2.0006	12.9884***	-0.0114	-0.0080	0.3449***	-0.0114	0.1498	1.9942	12.4453***								
+25	-0.0551*	0.4158***	0.1207***	0.1744	2.0179	14.7195***	-0.0197	0.0115	0.4087***	-0.0197	0.1714	2.0108	14.4358***								
Panel C: Dummy variable (D) for an increase in PBDIT (year-on-year)											Panel D: Change in PBDIT (X') by avg. REV (year-on-year)										
Days	$\alpha$	$\beta$	$\gamma_{PBDIT-4}$	Adj. R <sup>2</sup>	D-W Stat	F-Stat	$\delta_{PBDIT-4}$	$\alpha$	$\beta$	$\delta_{PBDIT-4}$	Adj. R <sup>2</sup>	D-W Stat	F-Stat								
-25	0.0795**	0.4992***	0.1112***	0.1370	2.0726	11.2804***	-0.0006	0.1554***	0.4975***	-0.0006	0.1334	2.0619	10.9651***								
-20	0.0876**	0.4686***	0.1167***	0.1373	2.0721	11.3036***	0.0008	0.1674***	0.4660***	0.0008	0.1343	2.0643	11.0412***								
-15	0.0750	0.3477***	0.1391**	0.1226	2.0578	10.0461***	-0.0022	0.1705***	0.3418***	-0.0022	0.1196	2.0510	9.7957***								
-10	0.0236	0.1900***	0.2091***	0.1118	1.9889	9.1472***	0.0166	0.1660***	0.1860***	0.0166	0.1077	1.9828	8.8105***								
-5	-0.0365	0.0434	0.1658	0.0688	2.0315	2.4936***	0.0261	-0.0026	-0.0078	0.0261	0.0894	2.1008	2.9851***								
+5	-0.2019**	0.0054	0.2592**	0.0558	2.1277	2.1946***	-0.0258	-0.0258	0.0062	-0.0258	0.0541	2.1234	2.1565***								
+10	-0.1980***	-0.0058	0.2878***	0.0949	2.1092	3.1210***	0.0261	-0.0026	-0.0078	0.0261	0.0894	2.1008	2.9851***								
+15	-0.1391**	0.2639***	0.2088***	0.1336	2.0849	4.1189***	0.0133	0.0030	0.2660***	0.0133	0.1291	2.0772	3.9975***								
+20	-0.0998**	0.3607***	0.1666***	0.1548	2.0919	4.7049***	-0.0020	0.0138	0.3645***	-0.0020	0.1507	2.0813	4.5886***								
+25	-0.0609	0.4239***	0.1250***	0.1736	2.1094	5.2484***	-0.0053	0.0241	0.4266***	-0.0053	0.1705	2.0998	5.1584***								

Notes: This table shows the results of panel data regression. The dependent variable is annualized returns before and after (denoted by negative and positive days, respectively) the date of announcement of quarterly financial results. In Panel A, the explanatory variable is the dummy variable for profit before depreciation interest and tax (PBDIT), where '1' represents the increase in PBDIT compared to the previous quarter while '0' represents the decrease in PBDIT compared to the previous quarter. In Panel B, the explanatory variable is the continuous variable X' representing rupee changes of PBDIT over their previous quarter values scaled by average REV. In Panel C, the explanatory variable is the dummy signifying increase (1) or decrease (0) in PBDIT year-on-year (Q<sub>t</sub> over Q<sub>t-4</sub>). In Panel D, the explanatory variable is the rupee change in the value of PBDIT year-on-year (Q<sub>t</sub> over Q<sub>t-4</sub>) also scaled by average REV for the period. Market Return (MR) is the control variable in all cases. Random-effects and fixed-effects have been applied (ref to Table 11) as per the case may be with a preference to random-effect model, but the tests and results are not included here for brevity. The symbol "\*\*\*\*" refers to a significance at 1% level; "\*\*\*\*" refers to a significance at 5% level and "\*\*\*\*" refers to a significance at 10% level

**Table 5. Effect of change in earnings from firm operations (EFO) on stock returns around the announcement date**

<b>Panel A: Dummy variable (D)</b> for an increase in EFO (quarter-to-quarter)												<b>Panel B: Change in EFO (X)</b> by avg. REV (quarter-to-quarter)											
Days	$\alpha$	$\beta$	$\gamma_{EFO}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{EFO}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{EFO}$	Adj. $R^2$	D-W Stat	F-Stat					
-25	0.1154***	0.5071***	0.0820**	0.1499	2.0623	12.4537***	0.1598***	0.5105***	0.1848*	0.1492	2.0580	12.3909***	0.1598***	0.5105***	0.1848*	0.1492	2.0580	12.3909***					
-20	0.1303***	0.4716***	0.0679*	0.1467	2.0580	12.1669***	0.1669***	0.4739***	0.2341**	0.1474	2.0565	12.2295***	0.1669***	0.4739***	0.2341**	0.1474	2.0565	12.2295***					
-15	0.1122***	0.3426***	0.0986**	0.1268	2.0454	10.4336***	0.1656***	0.3455***	0.3211**	0.1276	2.0449	10.4971***	0.1656***	0.3455***	0.3211**	0.1276	2.0449	10.4971***					
-10	0.0657	0.1796***	0.1507**	0.1136	1.9993	9.3201***	0.1481***	0.1811***	0.3412**	0.1128	2.0005	9.2556***	0.1481***	0.1811***	0.3412**	0.1128	2.0005	9.2556***					
-5	-0.0389	0.2355***	0.1736*	0.0157	2.0074	18.1033***	0.0568	0.2363***	0.1912	0.0143	2.0067	16.4967***	0.0568	0.2363***	0.1912	0.0143	2.0067	16.4967***					
+5	-0.2908***	0.0200	0.4255***	0.0665	2.1257	2.5426***	-0.0575	0.0059	0.2774	0.0387	2.0580	3.6171***	-0.0575	0.0059	0.2774	0.0387	2.0580	3.6171***					
+10	-0.2727***	0.0338	0.4572***	0.0932	2.0134	7.6738***	-0.0225	0.0191	0.4427**	0.0778	2.0117	6.4790***	-0.0225	0.0191	0.4427**	0.0778	2.0117	6.4790***					
+15	-0.2139***	0.2792***	0.3579***	0.1366	1.9966	11.2725***	-0.0174	0.2685***	0.2885*	0.1213	1.9903	9.9646***	-0.0174	0.2685***	0.2885*	0.1213	1.9903	9.9646***					
+20	-0.1556***	0.3494***	0.2667***	0.1621	2.0004	13.5658***	-0.0087	0.3461***	0.2524*	0.1504	1.9872	12.4966***	-0.0087	0.3461***	0.2524*	0.1504	1.9872	12.4966***					
+25	-0.0978***	0.4125***	0.1973***	0.1802	2.0217	15.2705***	0.0109	0.4130***	0.2270**	0.1717	2.0048	14.4603***	0.0109	0.4130***	0.2270**	0.1717	2.0048	14.4603***					
<b>Panel C: Dummy variable (D)</b> for an increase in EFO (year-on-year)												<b>Panel D: Change in EFO (X)</b> by avg. REV (year-on-year)											
Days	$\alpha$	$\beta$	$\gamma_{EFO,t-4}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{EFO,t-4}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{EFO,t-4}$	Adj. $R^2$	D-W Stat	F-Stat					
-25	0.0825**	0.4986***	0.1092***	0.1370	2.0742	11.2741***	0.1540***	0.4976***	0.0858	0.1338	2.0631	10.9977***	0.1540***	0.4976***	0.0858	0.1338	2.0631	10.9977***					
-20	0.0937**	0.4691***	0.1098**	0.1370	2.0745	11.2774***	0.1661***	0.4661***	0.0828	0.1346	2.0646	11.0640***	0.1661***	0.4661***	0.0828	0.1346	2.0646	11.0640***					
-15	0.0876*	0.3469***	0.1234**	0.1220	2.0564	9.9923***	0.1700***	0.3417***	0.0333	0.1197	2.0515	9.7983***	0.1700***	0.3417***	0.0333	0.1197	2.0515	9.7983***					
-10	0.0699	0.1654***	0.1467**	0.1171	2.0589	3.6825***	0.1634***	0.1845***	0.1727	0.1081	1.9853	8.8447***	0.1634***	0.1845***	0.1727	0.1081	1.9853	8.8447***					
-5	-0.0347	0.0424	0.1665	0.0688	2.0324	2.4940***	0.0689	0.0406	0.4603*	0.0693	2.0323	2.5063***	0.0689	0.0406	0.4603*	0.0693	2.0323	2.5063***					
+5	-0.1665*	0.0062	0.2116*	0.0550	2.1281	2.1784***	-0.0295	0.0041	0.2307	0.0539	2.1263	2.1528***	-0.0295	0.0041	0.2307	0.0539	2.1263	2.1528***					
+10	-0.1962***	-0.0039	0.2915***	0.0951	2.1127	3.1256***	-0.0092	-0.0088	0.4104**	0.0913	2.1067	3.0337***	-0.0092	-0.0088	0.4104**	0.0913	2.1067	3.0337***					
+15	-0.1277**	0.2619***	0.1957***	0.1330	2.0879	4.1045***	-0.0004	0.2660***	0.2227	0.1300	2.0812	4.0216***	-0.0004	0.2660***	0.2227	0.1300	2.0812	4.0216***					
+20	-0.1071**	0.3577***	0.1808***	0.1556	2.0948	4.7266***	0.0110	0.3642***	0.1697	0.1515	2.0853	4.6109***	0.0110	0.3642***	0.1697	0.1515	2.0853	4.6109***					
+25	-0.0643*	0.4207***	0.1326***	0.1740	2.1107	5.2605***	0.0226	0.4272***	0.0954	0.1708	2.1025	5.1676***	0.0226	0.4272***	0.0954	0.1708	2.1025	5.1676***					

Notes: This table shows the results of panel data regression. The dependent variable is annualized returns before and after (denoted by negative and positive days, respectively) the date of announcement of quarterly financial results. In Panel A, the explanatory variable is the dummy variable for earnings.

**Table 6. Effect of quarter-to-quarter change in profit after tax (PAT) on stock returns around the announcement date**

Panel A: Dummy variable (D) for an increase in PAT (quarter-to-quarter)										Panel B: Change in PAT (X) by avg. REV (quarter-to-quarter)									
Days	$\alpha$	$\beta$	$\gamma_{PAT}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{PAT}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{PAT}$	Adj. $R^2$	D-W Stat	F-Stat	
-25	0.1393***	0.5097***	0.0397	0.1482	2.0578	12.2993***	0.1598***	0.5138***	-0.0109	0.1478	2.0551	12.2643***	0.1677***	0.4728***	-0.0083	0.1456	2.0547	12.0674***	
-20	0.1390***	0.4720***	0.0541	0.1463	2.0557	12.1284***	0.1670***	0.3422***	0.0209	0.1254	2.0417	10.3084***	0.1493***	0.1811***	0.0243	0.1112	1.9967	9.1247***	
-15	0.1089***	0.3453***	0.1080**	0.1272	2.0420	10.4615***	0.0576	0.2362***	0.0459	0.0144	2.0058	16.6242***	0.0093	0.0093	-0.0254	0.0386	2.0597	3.6038***	
-10	0.0835*	0.1813***	0.1230**	0.1127	1.9986	9.2485***	0.0412	0.2645**	0.0338	0.0763	2.0118	6.3530***	0.0243	0.0243	0.0338	0.0763	2.0118	6.3530***	
-5	-0.0234	0.2342***	0.1510*	0.0153	2.0054	17.6244***	-0.0166	0.2679***	-0.0149	0.1204	1.9944	9.8922***	-0.0166	0.2679***	-0.0149	0.1204	1.9944	9.8922***	
+5	-0.1976**	0.0093	0.2645**	0.0412	2.0640	3.7882***	-0.0080	0.3448***	-0.0143	0.1498	1.9942	12.4446***	-0.0080	0.3448***	-0.0143	0.1498	1.9942	12.4446***	
+10	-0.1847***	0.0243	0.3074***	0.0836	2.0202	6.9261***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	
+15	-0.1287***	0.2738***	0.2109***	0.1259	1.9987	10.3543***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	
+20	-0.0891**	0.3478***	0.1522***	0.1537	2.0014	12.7909***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	
+25	-0.0402	0.4120***	0.0969**	0.1731	2.0185	14.5967***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	0.0114	0.4085***	-0.0254	0.1714	2.0106	14.4354***	

Panel C: Dummy variable (D) for an increase in PAT (year-on-year)										Panel D: Change in PAT (X) by avg. REV (year-on-year)									
Days	$\alpha$	$\beta$	$\gamma_{PAT,t-4}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{PAT,t-4}$	Adj. $R^2$	D-W Stat	F-Stat	$\alpha$	$\beta$	$\delta_{PAT,t-4}$	Adj. $R^2$	D-W Stat	F-Stat	
-25	0.0655**	0.5052***	0.1418***	0.1398	2.0744	11.5188***	0.1554***	0.4976***	-0.0029	0.1334	2.0620	10.9656***	0.1554***	0.4976***	-0.0029	0.1334	2.0620	10.9656***	
-20	0.0991***	0.4695***	0.1084**	0.1371	2.0695	11.2854***	0.1673***	0.4662***	-0.0024	0.1343	2.0643	11.0413***	0.1673***	0.4662***	-0.0024	0.1343	2.0643	11.0413***	
-15	0.1042**	0.3471***	0.1050**	0.1216	2.0540	9.9499***	0.1704***	0.3419***	-0.0068	0.1196	2.0508	9.7964***	0.1704***	0.3419***	-0.0068	0.1196	2.0508	9.7964***	
-10	0.0662	0.1900***	0.1594**	0.1102	1.9863	9.0194***	0.1662***	0.1856***	0.0141	0.1076	1.9827	8.8059***	0.1662***	0.1856***	0.0141	0.1076	1.9827	8.8059***	
-5	-0.0327	0.0677	0.1752*	0.0610	1.9601	5.2018***	0.0765	0.0415	0.0481	0.0678	2.0282	2.4702***	0.0765	0.0415	0.0481	0.0678	2.0282	2.4702***	
+5	-0.1552*	0.0037	0.2072*	0.0551	2.1261	2.1792***	-0.0251	0.0063	0.0832	0.0541	2.1233	2.1574***	-0.0251	0.0063	0.0832	0.0541	2.1233	2.1574***	
+10	-0.1839***	-0.0059	0.2909***	0.0955	2.1085	3.1349***	-0.0023	-0.0075	0.0390	0.0894	2.1009	2.9868***	-0.0023	-0.0075	0.0390	0.0894	2.1009	2.9868***	
+15	-0.1291**	0.2629***	0.2113***	0.1340	2.0833	4.1313***	0.0032	0.2661***	0.0208	0.1291	2.0773	3.9984***	0.0032	0.2661***	0.0208	0.1291	2.0773	3.9984***	
+20	-0.0338	0.3641***	0.0783	0.1516	2.0833	4.6158***	0.0137	0.3645***	-0.0016	0.1507	2.0813	4.5885***	0.0137	0.3645***	-0.0016	0.1507	2.0813	4.5885***	
+25	-0.0080	0.4262***	0.0528	0.1711	2.1025	5.1750***	0.0241	0.4266***	-0.0076	0.1705	2.0998	5.1586***	0.0241	0.4266***	-0.0076	0.1705	2.0998	5.1586***	

Notes: This table shows the results of panel data regression. The dependent variable is annualized returns before and after (denoted by negative and positive days, respectively) the date of announcement of quarterly financial results. In Panel A, the explanatory variable is the dummy variable for profit after tax (PAT), where '1' represents the increase in PAT compared to the previous quarter while '0' represents the decrease in PAT compared to the previous quarter. In Panel B, the explanatory variable is the continuous variable representing rupee changes of PAT over their previous quarter values scaled by average REV. In Panel C, the explanatory variable is the dummy signifying increase (1) or decrease (0) in PAT year-on-year ( $Q_t$  over  $Q_{t-4}$ ). In Panel D, the explanatory variable is the rupee change in the value of PAT year-on-year ( $Q_t$  over  $Q_{t-4}$ ) also scaled by average REV. Market return (MR) is the control variable in all cases. Random effects and fixed effects have been applied (refer to Table 1) as per the case may be with a preference to random-effect model, but the tests and results are not included here for brevity. The symbol "\*\*\*\*" refers to a significance at 1% level; "\*\*\*\*" refers to a significance at 5% level and "\*\*\*\*" refers to a significance at 10% level.

observation across all tables (Tables 3–6: panel A) is that the dummy variables have better explanatory power over the continuous percentage and rupee change in earnings variables (Tables 3–6: panel B). It implies that the “direction” of change in the earnings variables better explain stock returns before and after announcements.

Although all firms enjoy higher return in the pre-announcement period (3–5 weeks or before announcements), the firms that report an increase in quarter-to-quarter REV, earn a significantly higher premium (between 7.33% and 14.67% annualised, as indicated by Coefficients for REV dummy ( $\gamma_{REV}$ ) in Table 3: panel A) in the pre-announcement period. It supports the hypothesis that predictability of firms’ earnings numbers enables the investors to anticipate a directional change in REV much before the announcements. However, investors do not anticipate the percentage change in REV (Table 3: panel B). Stock prices reflect the percentage change in REV only after actual announcements. Even in post-announcement periods, a percentage change in REV lacks the explanatory power of the REV dummy variable.

Prices of “performers” and “non-performers” diverge in the weeks after announcements. Firms which announce lower REV witness a significant decrease in their stock returns, as seen from  $\alpha$  values in panel A (–33.79% in the first week to –9.74% in the fifth week, annualised). On the other hand, investors pay a significant premium for firms that have reported a higher REV than last quarter (44.70% in the first week to 17.25% in the fifth week, annualised), especially during the first 2 weeks. The market returns do not explain stock Returns for the first 2 weeks after announcements. This is consistent with the findings of Barber et al. (2013) that idiosyncratic firm risk (volatility) increases around earnings announcements, rendering the market risk insignificant.

The results for PBDIT, EFFO, and PAT for quarter-to-quarter changes is similar to REV. The dummy variable for an increase in the variables can explain the premium for “performers” before announcements (Tables 4–6: panel A), proving hypothesis 1 of the study. Post-announcements, the firms that report positive (negative) changes in these variables experience an increase (decrease) in their stock prices. However, investors cannot predict the scaled rupee change of PBIT and PAT pre-announcement (Tables 4 and 6: panel B). Even in the post-announcements period, the change in the values of PBDIT and PAT seems to have no impact on the movement of stock prices (Tables 4 and 6: panel A).

The scaled rupee changes in earnings from firm operations (EFFO) (Table 5: panel B) seems to have significant predictive power for stock prices. Until 10 days before the announcement, the stock returns of firms that later report a positive change in EFFO, receive a significant premium (18.48–34.12%). The effect of EFFO disappears about a week before the announcement. The effect of change in EFFO becomes significant again from the second week after the announcement. Post-announcement, the firms with a more considerable increase in EFFO show a higher stock return as well. The computation of EFFO excludes “other income” from PBDIT. Since EFFO is a measure of the firm’s “core” earnings (Fan et al., 2010), it carries significance for the investors. Thus, it can be argued that investors pay attention to a firm’s performance in its core operations, making EFFO a critical decision variable.

The evidence suggests that investors have some information about all earnings variables, especially REV before announcements. Being a “top-line” figure, REV is easier to be estimated, while the other three variables being measures of “profitability” are comparatively difficult to be estimated.<sup>12</sup> EFFO is intuitively a good measure of firms’ core performance, and the results suggest that the investors pay considerable attention to it. Further, the results indicate that the investors estimate the directional change of earnings more effectively than the rupee change in earnings.

#### 4.3. Regression analysis with a year-on-year change in quarterly earnings variables

The study further investigates whether the year-on-year ( $Q_t$  over  $Q_{t-4}$ ) change in earnings variables can explain stocks returns in the pre- and post-announcement periods (Tables 3–6: panels C and D). Results suggest that the investors do not strongly anticipate or act on a directional change in REV over  $Q_{t-4}$  (Table 3: panel C). It is significant only at 10% during 5- and 3-weeks before announcements. Even after announcements, a directional change in REV is only significant up to 2 weeks after announcements. After this period, it is no longer significant. The percentage change in REV is significant only till one-week post-announcement (Table 3: panel D).

Profitability measures PBDIT, EFFO, and PAT (Tables 4–6: panel C) become more significant in the year-on-year study than the quarter-to-quarter study. Investors anticipate a change in these measures even 5 weeks before announcements. The positive and significant values of the coefficients suggest that investors pay a significant premium for firms that eventually report higher profitability numbers. The coefficients of PBDIT and EFFO lose significance a week before the announcements while they remain significant at 10% for PAT.

Investors cannot estimate the information regarding scaled rupee changes in PBDIT and PAT values in  $Q_t$  over  $Q_{t-4}$  before the announcements, and their impact on stock returns is insignificant (Tables 4 and 6: panel D) even after the announcements. However, a week before the announcement, the coefficient of change in EFFO becomes significant at 10%. It strengthens the argument that the core earning of firms, indicated by EFFO, is closely analysed by investors.

Post-announcement, the scaled rupee changes in earnings variables do not have a consistently significant impact on stock returns. In contrast, the dummy variables indicating an increase in PBDIT, EFFO, and PAT continue to have a significantly positive impact on stock returns post-announcements. The findings indicate that whether the profitability increased or decreased is a more important decision variable for the investors, compared to how much it has changed.

#### 4.4. Analysis of panel fixed and random effects

Panel data effect specifications (random effects and fixed effects) for regression models based on quarter-to-quarter changes and year-on-year changes in earnings variables are presented in Table 7. Distinct reporting of model specifications helps in comparing several regression models. The observation from the table suggests that there are period fixed effects in most of the cases. Random effects in cross section are consistent for quarter-to-quarter change in earnings variables (Table 7: panels A and B) barring a few instances. However, in the case of the year-on-year change in earnings variables (Table 7: panels C and D), random effects mostly disappear in the regression for the week pre-announcement. In the post-announcement period regressions, random effects disappear entirely, and fixed-effects models explain both period and cross-section idiosyncrasies. The intuitive explanation of this phenomenon has two arguments: first, investors are unsure of the predicted earnings' trustworthiness in the pre-announcement period. Thus, cross-section idiosyncrasies are randomly distributed, resulting in a random effect in the pre-announcement period. Second, investors are unsure about the consistency of earnings performance over the previous quarter, leading to a cross-section random-effect in the post-announcement period. However, they are more confident when performance is measured year-on-year basis. It eliminates the effect of seasonality in earnings. Thus, investors consider this measure of performance to be more consistent over time. As a result, the post-announcement returns exhibit cross-section fixed effects in the year-on-year case.

#### 4.5. Average price behaviour around announcement dates: A graphical analysis

A simulation study is performed to facilitate understanding price behaviour before and after announcements for “performers” and “non-performers”. If 5 weeks before announcements, an average stock is priced at 100, then by using the average of annualised returns enjoyed by “non-

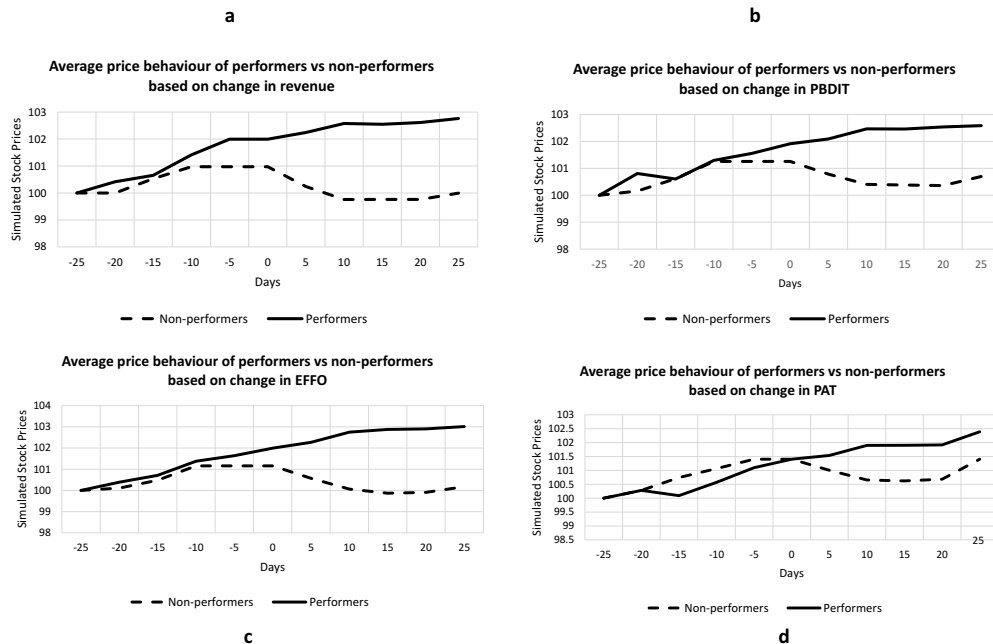
**Table 7.** Model specifications for panel data regressions in Tables 3 through 6

Days	Type	Panel A: Dummy variables (quarter-to-quarter)				Panel B: Percentage change variable (quarter-to-quarter)				Panel C: Dummy variables (Year-on-Year)				Panel D: Percentage change variable (year-on-year)			
		REV	PBDIT	EFFO	PAT	REV	PBDIT	EFFO	PAT	REV	PBDIT	EFFO	PAT	REV	PBDIT	EFFO	PAT
-25	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
-20	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
-15	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
-10	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
-5	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Cross section	F	R	F	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
10	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
15	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
20	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
25	Cross section	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	Period	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F

Notes: This table displays the panel data effects, fixed effects (F) and random effects (R) for regression models reported in Tables 3 through 6. Presence of fixed effect is validated with an F-test. Presence of random effect is validated with the help of the Hausman Test. Random effect is preferred over fixed effects wherever both are present. For each period and each earnings variable, the appropriate panel data effects in Cross-Section and Period are reported in separate rows and columns, respectively. Four panels represent four different measures of the earnings variables used in the study. If the fixed-effects are significant at 10% (or below) and the random-effects are consistent (at 10%), then the appropriate effects are reported.

**Figure 4. (Panel A) Average price behaviour of performers vs non-performers based on change in revenue.**

Note: Price behaviour obtained from regression depicting difference of firms that report higher REV, PBDIT, EFFO, and PAT vs firms that report lower values of these variables than last quarter. The starting price at 25 days prior to announcements is 100. The subsequent prices are derived for non-performers from the intercept ( $\alpha$ ) and for performers using both intercept ( $\alpha$ ) and coefficient of dummy variable ( $\gamma$ ).



performers” ( $\alpha$ ) and the premium obtained by “performers” ( $\gamma$ ) estimated earlier (Tables 3–6: panel A), it is possible to depict the price movement of average “performers” vs average “non-performers” for the entire period of study (Figure 4: panels A to D). Prices for all stocks rise before the announcement date, become flat as the announcement day approaches, and correct after the announcement. However, the “performers” experience even higher returns in the pre-announcement period until 1-week pre-announcement, thus supporting the argument for predictability of earnings information. Once the earnings numbers become publicly available, “performers” experience further increase in price and diverge from the “non-performers”.

The firms that report better revenue than previous quarter earn a premium in the pre-announcement period over firms that report worse revenue. It leads to the conjecture that “top-line” earnings information is predicted more effectively than the “bottom-line” profitability measures.

Further, the analyses show that the abnormal returns persist for weeks pre- and post-announcements, rather than just a few days around the announcement date, due to the information asymmetry and noise in the market. The post-announcement returns for “performers” is positive and significant for even 5 weeks after the announcement date.

## 5. Conclusion

This study attempts to analyse the behaviour of stock returns before and after the quarterly announcements, in anticipation of (pre-announcement) and reaction to (post-announcement) positive and negative changes in earnings. The results present a unique perspective of investor perception and market behaviour that emerges from the interaction of traders and market makers in an environment of information asymmetry. This information asymmetry results in higher returns for all stocks in the pre-announcement period. However, it is evident from the results that investors



may have an idea of whether the earnings will be “better” compared to the last quarter results. This predictability of earnings may be caused by analyst forecasts (L. D. Brown & Caylor, 2005) and by the announcements of dividends before the announcements of quarterly earnings results (Aharony & Swary, 1980).

The predicted earnings and the resulting informed trading, followed by trading activities of non-informed investors, lead to significantly higher return premiums for the stocks that end up reporting a better result than the previous quarter (or same quarter in the previous year). As the day of announcement approaches (1–2 weeks), the returns become insignificant. For 5 weeks after announcements, the stocks of firms that disclosed better results continue to provide higher returns as the information gets slowly absorbed. On the contrary, the firms with worse results experience a correction in stock prices. One of the key findings of the study relates to the earnings from core operations of firms. Investors seem to pay special attention to any news or speculation related to earnings from core operations. Thus, changes in core earnings figures are anticipated, and investors act upon them to price the stocks.

This paper highlights the stock price behaviour that facilitates the institutional and retail investors alike, to decide their entry and exit criteria. They can create strategies to “time the market” based on quarterly results by incorporating the context-specific improvisations into the existing model. It gives an insight that the market gives more attention to a change in the direction of earnings (or profitability) rather than the change in them.

### 5.1. Limitation and scope of future research

The sample in this study is comprised of large-cap Indian firms only. However, since the large-cap firms included in the sample account for a significant proportion of market turnover and market capitalisation in India, it is plausible to generalise the results obtained from this sample, to some extent, for the entire spectrum of liquid stocks in the Indian market. Future research can study how prices of small and mid-cap firms in India behave around earnings announcements. However, such firms must be studied after controlling for their relative illiquidity. From the results of this study, inferences can be drawn about stocks in other developing markets with comparable information asymmetry and microstructure issues such as in India. Therefore, researchers may expand this study to include more countries and a diverse set of firms to investigate whether the stocks across countries and sizes exhibit similar behaviour. Further, some determinants of information predictability, like dividend announcements or analyst reports, may be included to find whether they drive the investor behaviour around disclosure.

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#### Notes

1. This is consistent with the findings of previous research (Barber et al., 2013; Johnson & So, 2018; Savor & Wilson, 2016)
2. Dealers, brokers and market makers.
3. The price of a stock is  $x = \frac{CF(1+g)}{RoE-g}$ .
4. S&P BSE 100, computed in Indian Rupees, captures the performance of the 100 largest and most liquid Indian firms (contributes to 59.86% of total market turnover and more than half of free float market capitalization of all stocks listed in BSE). Data obtained from [www.bseindia.com](http://www.bseindia.com).
5. Centre for Monitoring Indian Economy's PROWESS is one of the most comprehensive database on Indian companies.
6. Companies that are categorised by CMIE PROWESS as banking and financial services.
7. See Table 1 for computation

8. Impact of common return predictors (size, B/M, etc.) are controlled through cross section fixed/random effects. The quarterly seasonality is controlled through period fixed/random effects.
9. In those cases, where both random and fixed effect were found to be significant, the random effect is preferred (Greene, 2018; Racicot & Rentz, 2017)
10. Consistent with Johnson and So (2018)
11. Random and fixed effects are used when relevant and are reported in Table 7.
12. Due to the presence of costs, depreciation, tax, etc., which are difficult to estimate.

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