By Aloysius Igboekwu Loughborough University United Kingdom.

Earnings Momentum: Asymmetry in sequences of quarterly earnings changes

Abstract: This paper examines the U.S S&P500 companies for the evidence that earnings momentum can be found in their stocks. For successive, sequences of quarterly earnings-per-share change outcomes, companies were measured for either a negative or positive outcome. Principally, the changes in earnings sequences of 837 companies observed seem to show that earnings momentum exist in those stock. More than 22% of the time, companies consistently posted positive earnings-per-share change increases for a period of three years as against a little under 2% that consistently posted declining quarterly earnings-per-share change for a period of three years. There seems to be clear evidence of asymmetry in the distribution of positive and negative sequences of earnings-per-share change outcomes. Over 60% of the companies posted small increase or decrease in earnings-per-share change which clustered around zero. The stocks of companies with longer strings of positive earnings change show average abnormal returns of about 24% per annum and this is larger for companies with shorter strings.

Section 1

Introduction /Background of Study: A good number of papers have looked at the symmetry of quarterly earnings change distribution. Some have looked at the link between this and the level of earnings of the firms while others try to interpret it in terms of earnings management to exceed thresholds. It has also been of keen interest to some scholars to see if there is any relation between the distribution of quarterly earnings changes, its sequences, intensity and the level of returns by the companies' stocks. Myers J.et al (2007) provides evidence on firms that report long strings of consecutive increases in earnings-per-share. They report that the intensity of the earnings momentum is far more than expected and attribute this to earnings management. They also find that there is relation between the abnormal returns enjoy by those firms and the length of the earnings momentum in these firms. Interestingly they find that abnormal returns are higher for firms reporting long strings of increases in quarterly earnings-per-share for a period of five years than those that report increases in just their annual earnings per share over the same length of time.

Beaver et al (2007) in their paper seem to support the Durtshi C. and Easton P. (2005) argument. They posit that the discontinuity in the distribution of price-deflated earnings changes are largely driven by the same factors that cause discontinuity in the distribution of price-deflated earning levels. As described by Beaver *et al* (2007), "the term "discontinuity" is a shorthand terminology for an unusually low frequency of small loss observations and an unusually high frequency of small profit observations, relative to the frequencies in the adjacent intervals of earnings distribution. It does not imply that the cumulative distribution function is discontinuous at zero." In line with Beaver *et al* (2007) submission, my sample data show high frequency of small positive quarterly earnings-per-share changes relative to small negative quarterly earnings changes even when this is deflated with beginning-of-period market price. I have no particular explanation as to why this is the case.

This paper examines the U.S S&P500 companies for the evidence that earnings momentum can be found in their stocks. For successive sequences of quarterly earnings change outcomes, companies were measured for either a negative or a positive outcome. I investigate the relation between the buy and hold abnormal returns three months following immediately after the earnings announcement date and the sequences of quarterly earnings changes (with particular interest in the changes that occur in this relation as the intensity of the earnings change grows or diminishes). The main difference between this study and that of Myers et al (2007) is that this also investigates the strings of consecutive negative quarterly earnings change over a long period of between twelve and twenty quarters.

This study is motivated by the Barberis, Shleifer, and Vishney (1998) paper (henceforth BSV) titled 'A model of investor Sentiment'. The model predicts that there is symmetry in the distribution of earnings realisation of firms in terms the number of positive and negative sequences reported by these firms. The model predicts that firm's earnings move between two different regimes of trending and mean-reversion and it's seen as such by the investor. The model also assumes there is a continuation once a trending or reversion earnings generating regime is observed and transitions between the two regimes rarely occurs. What matters therefore is the state or regime (i.e. whether he is in reversion or trending state)

which the investor thinks he is in and not the duration or the length of time he spends in that state.

The objective of this study is different from the previous studies some of which I have already mentioned above in that my interest is not in looking for answers as to the cause of the long strings of positive quarterly earnings-per-share changes but rather to show if there is any link between the symmetry and abnormal returns amongst these companies. Basu S. (1997) use firm's stock returns to predict that the contemporaneous effect of earnings to negative returns is about two to six times that of earnings to positive returns. He finds that the negative earnings changes are less persistent than positive earnings changes. My sample show that more firms report long strings of positive quarterly earnings change for up to three years(twelve quarters) whereas few firms (under two percent) report consecutive negative quarterly earnings changes for up to a period of three years.

Section 2

Related literature: The symmetry of quarterly earnings-per-share changes could provide some insight into the behaviour of a firm's stock returns. Many scholars seem to agree to the fact that earnings is one of the most used accounting variables by investors, analysts, company executives and even board members to measure the performance of a firm over a period of time. Degeorge *et al* (1999) argue that the returns to equities are largely explained by their cumulative earnings over the medium to long term while other accounting variables such as dividends, cash flows, or capital investments show marginal correlations that are close to zero. So it is not surprising that interest groups are very keen on watching companies' earnings over period of time and using that information for valuation of companies' equities. Degeorge *et al* (1999) argue that there is element of earnings management by companies' executives which is tied to incentives. They identify earnings management to exceed three thresholds viz: report positive profits, sustain recent performance, and meet analysts' expectations. Myers *et al* (2007) in support of Degeorge et al posit that observed long strings of positive increase in quarterly earnings for about twenty quarters is attributable to earnings management by

managers of companies. They present evidence to show that companies with long strings of positive increases in quarterly earnings show higher stock abnormal returns than companies with shorter strings. Additionally, they show that these firms enjoy significant abnormal returns while the strings are growing but their abnormal returns begin to decline once that string is broken.

Burgstahler and Dichev (1997a) provide evidence to show that firms manage their earnings to avoid losses. They posit that their empirical work show cross-sectional distribution of earnings changes with unusually low frequencies of small decreases in earnings and unusually high frequencies of small increases in earnings and small positive income. Their paper suggest that two component of earnings; cash flow from operations and changes in working capital are responsible for the asymmetry in the distribution of earnings changes as they are used to achieve increases in earnings. Additionally, they provide evidence to show that in their empirical work, 8% to 12% of the firms with small pre-managed earnings decreases exercise discretion to report earnings increases. In similar manner, they report that 30% to 40% of the firms with slightly negative pre-managed earnings manipulate their earnings to report positive earnings. However, some researchers have argued that the asymmetry seen in the distribution of quarterly earnings change is not due to earnings management per se but may be attributable to other factors.

Dechow *et al* (2003) building on submission of Burgstahler and Dichev (1997a) which claim that the 'kink' or discontinuity in earnings distribution is as a result of earnings management, argue that earnings management is not a complete explanation of the observed discontinuity in earnings distribution. Their main objective was to find out if earnings management is a complete or partial explanation for the kink or discontinuity in earnings distribution. They claim that their evidence suggest that selection biases as a result of exchange listing requirements (exchanges tends to have selection bias towards profit making firms) provide partial explanation for the kink and scaling earnings by market value also influence the magnitude of the kink. They also document that the magnitude of earnings kink and earnings change kink have both declined over the years whereas analyst forecast error kink has increased. Thus they reinterpret the claims of Degeorge *et al* (1999) that the hierarchy of thresholds is first to report a profit, second to report an increase

in profit , and third to meet analysts' forecasts; according to Dechow et al (2003), evidence suggest that in more recent years meeting analysts' consensus forecasts is becoming the more important hurdle.

Durtschi C. and Easton P. (2005, 2009) argue that the observed discontinuities in earnings distribution around zero are likely caused by factors other than earnings management. They provide evidence showing that the discontinuities in earnings distributions frequency around zero are more likely to be caused by three main factors including; deflation (caused by scaling earnings change by price or market capitalization of stock), sample selection criteria that would encourage inclusion or exclusion of observations far to the left or right of zero, differences between the characteristics of observations to the left of zero and observations to the right of zero, and a combination of the above factors'. They contend that because of large differences in prices between profit making firms and loss makings firms' stocks, sample selection criteria and price differences are likely the cause of discontinuities around zero in the distribution of earnings per share rather than an outright earnings management

Beaver *et al* (2007) believe that discontinuity in the distribution of earnings at zero is a result of asymmetric effects of income taxes and special items for profit and loss firms. They argue that the effects of these two earnings components either draw the profit observations towards zero or draws loss observations away from zero resulting in discontinuity. They posit that firms with pre-tax losses have significantly lower effective tax rates than firms with pre-tax profits, while negative special items are significantly greater in magnitude and more frequent for firms with negative earnings before special items. Unlike Myers *et al* (2007), they posit that the discontinuity in earnings distribution around zero is not evidence that managers exercise discretion in managing earnings to avoid loss. Beaver *et al* (2007) seem to agree with Dechow *et al* (2003) and Durtschi and Easton (2005) that discontinuity is driven by properties of the deflator (for example the market value) rather than the behaviour of the earnings itself.

The above has been vast literature on the asymmetry in the distribution of earnings change but has been largely in the earnings management literature. Similar to other

literature that linked asymmetry to abnormal returns in the firms stocks, my work show that trending sequences were much longer than negative sequences. And more so, the length of the sequences seems to be a determinant of the size of the abnormal return that the firm's stock enjoys. Besides this, there seems to be clear evidence that there is asymmetry in the distribution of quarterly earnings changes and the intensity of the sequences matters to the investors.

The remaining part of the paper is organised as follows: section three describes the data set and the sample selection process, section four describes the research methods and the measurement of proxies, section five shows the result of the empirical analysis and graphs, and in section six I discuss the results and conclude the paper.

Section 3

Data and Sample Selection: The 'actual' quarterly earnings-per-share (Q_{it}) data used in this study is collected from the Institutional Brokers' Estimate System (I/B/E/S) database to reconcile earnings outcomes with expectations of them. The sample of United States S&P500 companies covers the years between 1991 and 2006. All the companies which entered the index over this period of time are all included in the sample no matter whether they have left the index as at the date of sampling. The reason for this is to avoid sampling survivorship bias which will otherwise introduce error into the results. The sample contains 525 companies yielding 23,149 company-quarters of earnings-per-share changes. I exclude a few extremely large changes in earnings-per-share figures which seemed suggestive of errors in the IBES database. I used the companies that have at least eight quarters of earnings-per-share data and two years of stock price data available over the sample period.

The stock market response to the intensity of the strings of earnings-per-share change are captured by returns calculated form DataStream prices subject to Fama-French 3-factor asset pricing model benchmark using weights from rolling annual regression for each sample company over five years of monthly data and the factors given for the US market on Professor Ken French's data library website.

Section 4

Research Method

4.0 Variable Measurement

4.1 Quarterly earnings-per-share change

The quarterly earnings-per-share change is measured following the Kothari et al (2004) procedure. I use an annually smoothed quarterly earnings (an annualised quarterly earnings change of four rolling quarters) metric of the form:

$$\Delta eps = \left[\frac{Q_{t-1} + Q_{t-2} + Q_{t-3} + Q_{t-4}}{Q_{t-5} + Q_{t-6} + Q_{t-7} + Q_{t-8}}\right] - 1$$

Where (Q_t) is earnings-per-share for quarter *t* and each quarterly earnings change is scaled by beginning-of-period price as shown below. This is to ensure that the quarterly earnings-per-share change for all the companies are comparable to each and are fit for panel regression.

$$\Delta eps = \{\left[\frac{Q_{t-1} + Q_{t-2} + Q_{t-3} + Q_{t-4}}{Q_{t-5} + Q_{t-6} + Q_{t-7} + Q_{t-8}}\right] - 1\}\, {}^{1}/_{P_{t-1}}$$

The consistency of growth of the quarterly earnings change (annualised) for each of the companies is measured over a period of three and five years (twelve and twenty quarters) respectively. By using this metric it is assumed here that investors usually compare growth in earnings-per-share same quarters over one year period.

4.2 Computation of Returns

The monthly historical stock returns are calculated following the simple returns measure from equation below assuming zero dividends.

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where (R_t) is the stock return at time *t* and (P_t) is the stock price at time *t.*

A benchmark for the investors' expected returns is calculated following the Fama – French 3-factor model procedures.

$$E(R_{jt}) = a_j + b_j MRP_t + s_j SMB_t + h_j HML_t + \varepsilon_t \qquad j = 1, \ldots\ldots N; t = 1, \ldots\ldots, T$$

The Fama-French factor loadings are estimated using weights from rolling annual regressions for each of the six stock portfolios over five years of monthly data and the market premium, size and value factors given for the US market on Professor Ken French's data library. The portfolios are constructed following the procedures of Fama-French three factor model.

4.2.1 Abnormal Returns

Abnormal returns (ABR) are calculated using the equation:

$$ABR = \overline{R} - (a_j + b_j MRP_t + s_j SMB_t + h_j HML_t)$$

Abnormal Returns= Actual Stock return – Expected Stock Return

4.2.2 Buy and Hold Abnormal Returns (BHAR): I calculate the buy-and-hold abnormal returns on the stocks over the following beginning with earnings announcement month and three months following earnings announcement. I calculate the cumulative abnormal returns (CAR) which is highly correlated to the BHAR suggestive of the fact that similar results are likely if CAR rather than BHAR is used in the regression. Also in using the BHAR, I assume that this better resembles most investors' actually investment experience than periodic (monthly) rebalancing used in other strategies in measuring risk-adjusted performance (see Kothari and Warner as edited in B. Espen Eckbo 2007).

$$BHAR_{jt} = \prod_{t=1}^{T}(1 + R_{jt}) - \prod_{t=1}^{T}(1 + E(R_{jt}))$$

Section 5

Results: Graphical display of distribution and consistency

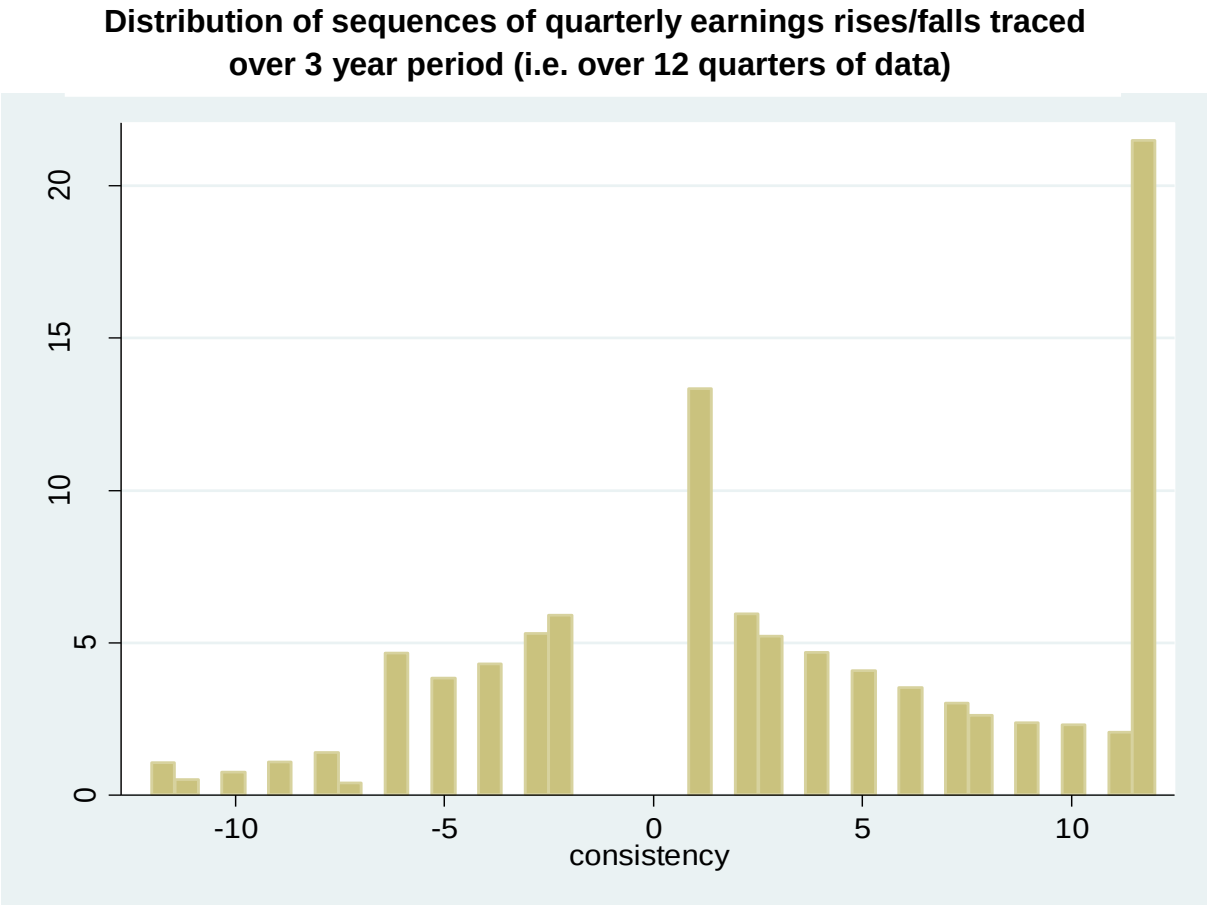

Figure 1

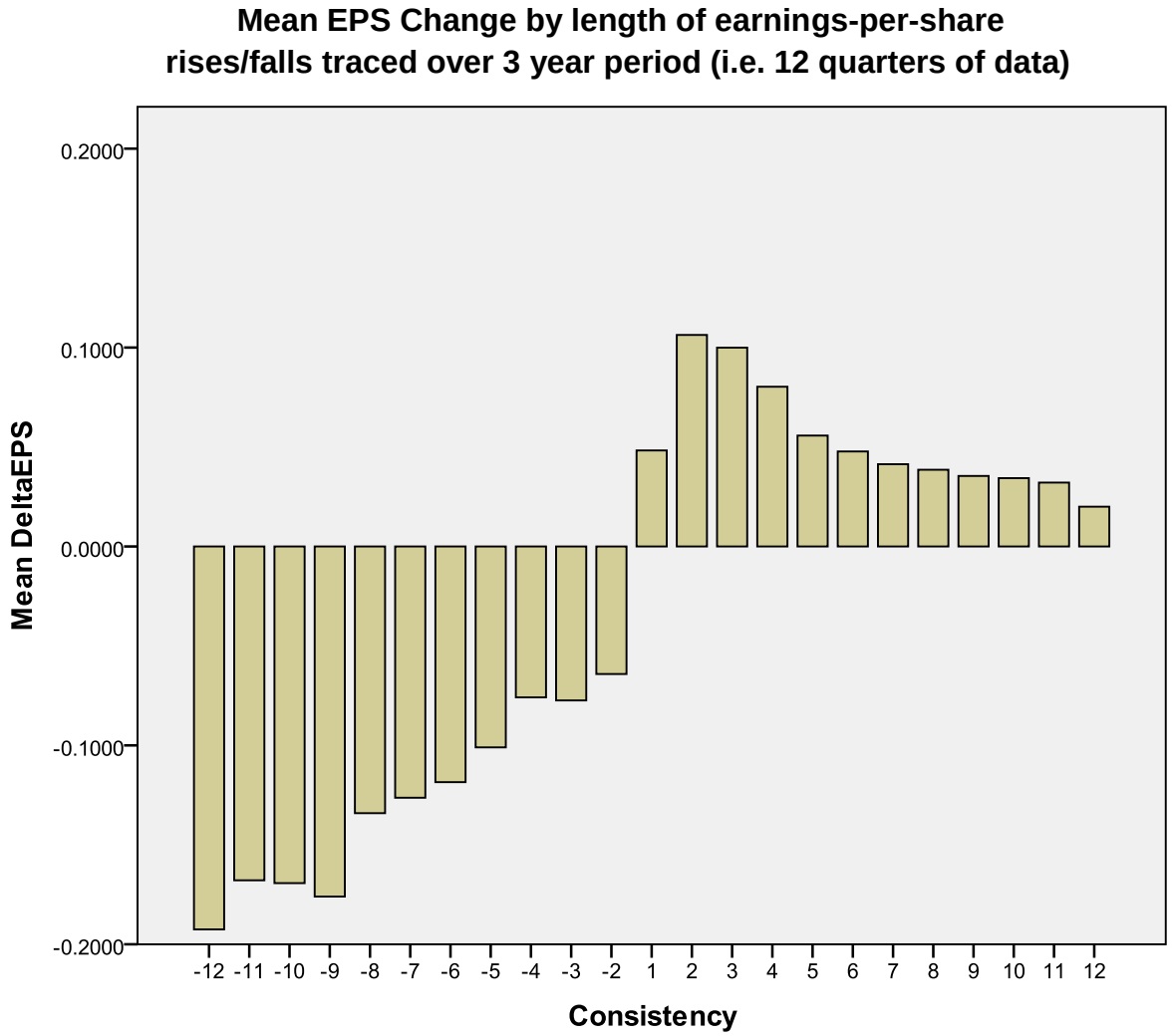
Mean EPS Change by length of earnings-per-share rises/falls traced over 3 year period (i.e. 12 quarters of data)
Mean DeltaEPS
0.2000
0.1000
0.0000
-0.1000
-0.2000
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 1 2 3 4 5 6 7 8 9 10 11 12
Consistency

Figure 2

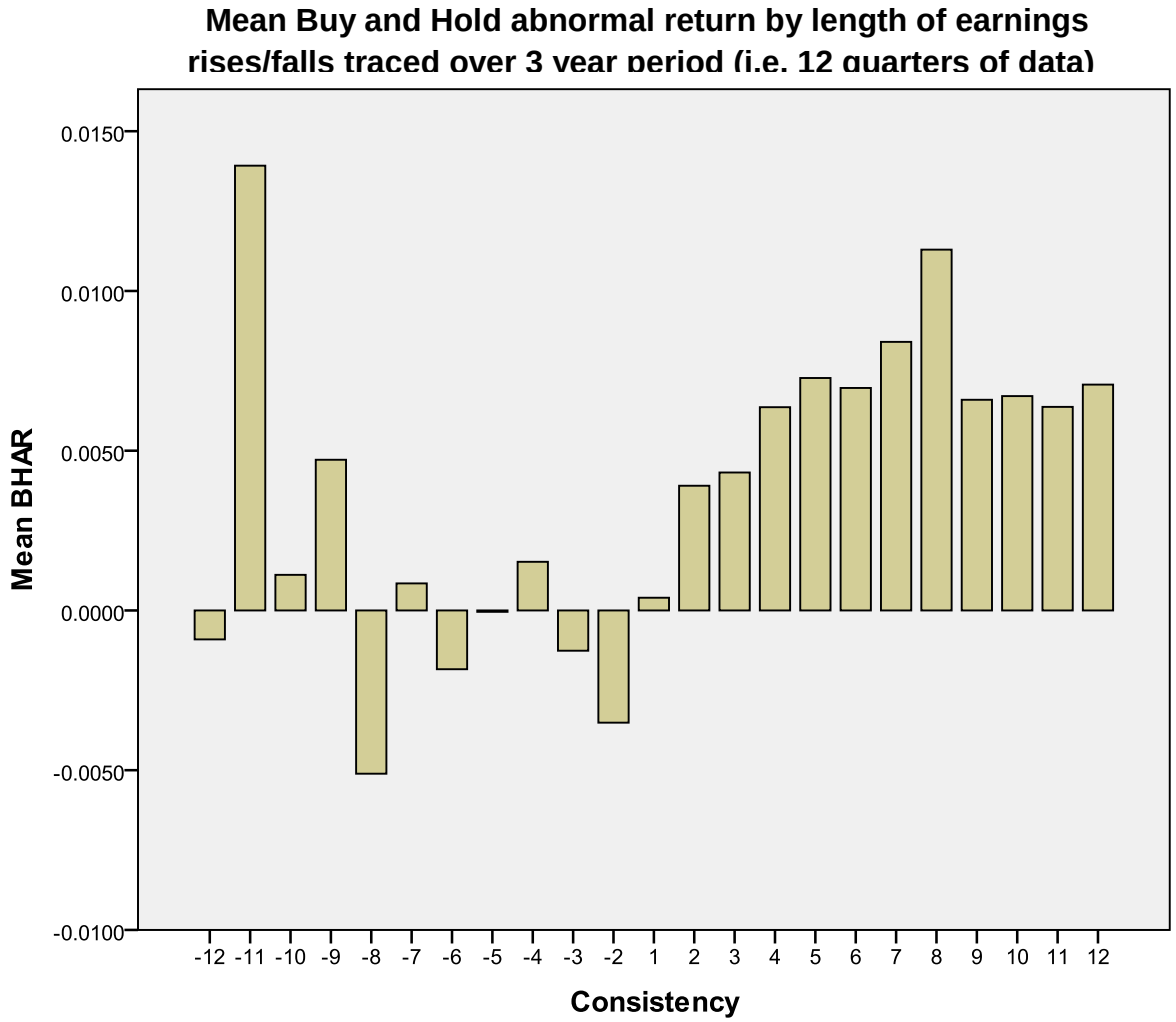
Mean Buy and Hold abnormal return by length of earnings rises/falls traced over 3 year period (i.e. 12 quarters of data)
Mean BHAR
0.0150
0.0100
0.0050
0.0000
-0.0050
-0.0100
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 1 2 3 4 5 6 7 8 9 10 11 12
Consistency

Figure 3

Distribution of quarterly earnings-per-share

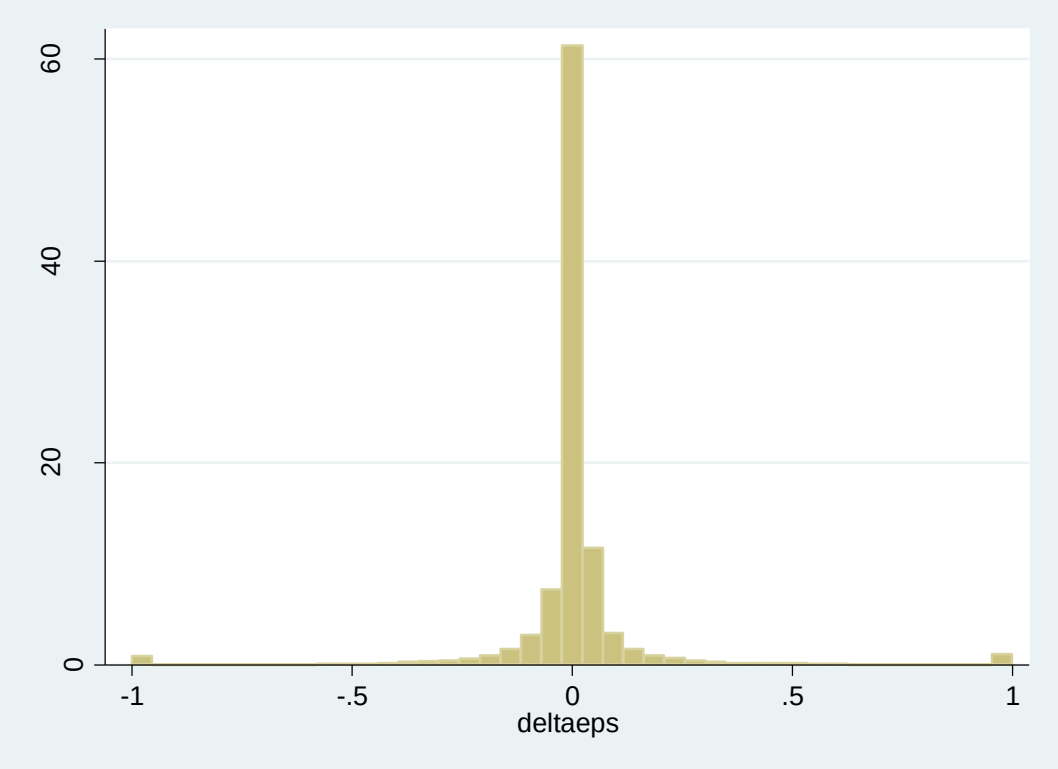

Figure 4

Regression Analysis

Table 1: Spearman's rank correlations for key sample variable

	BHAR	Consistency	CAR	DeltaEPS
BHAR	1.000	0.064**	0.992**	0.099**
Consistency	0.064**	1.000	0.053**	0.633**
CAR	0.992**	0.053**	1.000	0.095**
DeltaEPS	0.099**	0.633**	0.095**	1.000

**Correlation is significant at 0.01 Level (2-tailed)

Table 2: Regression of BHAR on earnings variables

BHAR	Coef.	Std.Err./Robust	t	P>|t|	[95% Conf. Interval]
Consistency	0.000801	0.000912	0.88	0.380	-0.000988 0.0002589
DeltaEPS	0.0033921	0.0045219	0.75	0.453	-0.0054711 0.0122553
PEChanges	0.0068252	0.0013758	4.96	0.000	0.0041285 0.0095218
Constant	-0.0014835	0.0007797	-1.90	0.057	-0.0030117 0.0000447

Table 3: Regression of Buy and Hold abnormal returns on earnings variables

Constant	∆EPS	Consistency	Consistency X ∆EPS	N	R^2
0.015(3.79)	0.003(8.70)			23149	0.001
-0.0004(-0.89)	0.011(2.74)	0.0005(9.55)	0.007(8.05)	23149	0.01
0.002(4.90)	0.0001(1.35)	0.0004(8.17)		23149	0.003

Section 6

Discussion and Conclusion:

This study found that there is great asymmetry in the way the companies report increases or decreases in quarterly earnings-per-share over a period of three to five years. As seen from the histogram in result section, it clearly shows that 22% of the firms report positive increases in quarterly earnings-per-share consistently for twelve quarters whereas just a little over 2% of the firms reported decline in quarterly earnings-per-share quarter on quarter for twelve quarters. I believe that this should be the case in real world as one would expect that firms that report decline in earnings consistently for that length of time are likely to be withdrawn from the S&P 500 index before the twelfth quarter decline.

There is clearly a relationship between returns are the negative and positive strings quarterly earnings-per-share change. This seems to confirm the position of Myers et al (2007) who reported that the length of these strings is directly related to the level of abnormal returns witnessed by these firms. An interesting find of this study is that the increase in abnormal returns starts to decline after eight quarters of consistent increase for those companies that report positive increase in earnings-per-share beyond eight quarters. This shows that the length and the intensity of earnings momentum matters and that could help to predict the intensity and length of the stock's abnormal returns. It is also suggestive of the fact that investors do 'watch' the length of these long strings of positive earnings changes and this is likely to affect their investment behaviour.

It is evident from figure four that over 60% of the companies in my sample reported small increases in quarterly earnings-per-share changes clustered around zero. This collaborates findings already in literature with some scholars arguing that this a clear evidence of earnings management to avoid losses. From figure 3 it is evident companies with long strings of positive quarterly earnings-per-share change enjoy abnormal returns over a long period of time. But there is no discernible reason for the returns on stocks of companies reporting declining earnings over long period of time especially, when after eight quarters of consistent declining earnings those stocks earns high premium. The only explanation I can think of is that it is likely that

such companies compensate investors for holding their stock (of declining earnings) for such a long time – for sticking with them so to speak.

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