

## Does the stock market fully understand the earnings announcement?

Studies about the link between earnings numbers and stock prices can be grouped in to a number of categories. Two major groups are:

those that concentrate on the *anticipation* of earnings by stock prices, for example Kothari & Sloan, "Information in prices about future earnings", *Journal of Accounting & Economics*, 1992;

those that concentrate on the market's *lagged reaction* to some information, for example Bernard & Thomas, "Post earnings announcement drift: delayed price response or risk premium?", *Journal of Accounting Research*, 1989 (Supplement).

A strand of research which is related to post earnings announcement drift concerns whether the market really understands the earnings announcement. The idea is that because the market initially misunderstands the signal, the market's full response to the disclosure comes much later.

The possibility that the market misunderstands signals, is the focus of the papers to be examined here. The first, Bernard and Thomas, find that the market is surprised by earnings announcements that were perfectly predictable. Two initial comments might be made:

One is that it is important to identify the rationale behind any market misunderstanding. For example, is it driven by the incomprehensibility of company accounts? Should the structure of the financial statements be changed?

Another is that the finding may be, in fact, consistent with equilibrium in the capital market. The paper by Grossman and Stiglitz, "On the impossibility of informationally efficient markets", *American Economic Review*, 1980 was one of the first to suggest that information discovery is not costless, and that unless transactions costs are zero, not all relevant information will be impounded in price.

### **Bernard and Thomas, "Evidence that stock prices do not fully reflect the implications of current earnings for future earnings", *Journal of Accounting and Economics*, 1990.**

Bernard and Thomas investigate the market's reaction to quarterly earnings announcements. They find that for a given quarter, the market reacts as if it has the naive expectation that the announcement will be equal to the earnings of the same quarter of the previous year.

Their findings can best be illustrated by the example they give on page 310, just below Table 1.

	Year 0	Year 1	Year 2
Q1	10	11	10.76
Q2	10	10.34	
Q3	10	10.19	
Q4	20	20.06	

Suppose there is a company that has a history of earnings announcements in year 0 as follows, Q1:10, Q2:10, Q3:10, Q4:20.

From empirical evidence about the time series properties of quarterly earnings we know that if 11 is announced at year1:Q1 (that is an increase of 1 over the previous year), then subsequent increases over the previous corresponding quarter will be smaller and smaller as the quarters go by. We might expect an increase of 0.34 for the second quarter, 0.19 for the third quarter, 0.06 for the fourth quarter. Finally, the first quarter in the following year would actually be smaller than year1:Q1 at 10.76.

However, BT find that the market reacts as if does not have these informed expectations. The market seems to naively expect that earnings will be equal to those in the same quarter of the previous year. For example, in year1:Q2 there is an expectation of 10 and when 10.34 is announced the market is surprised. In year1:Q3 there is also an expectation of 10, and when 10.19 is announced the market is surprised. Expectations for year1:Q4 are 20 and for year2:Q1 are 11.

The main method used in the Paper is to compare (i) the autocorrelation structure of changes in quarterly earnings and compare them with (ii) the properties of abnormal returns. The two sets of data match up quite well, and this has important conclusions. If changes in earnings are mimicked by stock returns, then this suggests that the market is using the level of earnings at the beginning as its expectation of the future earnings announcement.

### **Ball and Bartov, How naive is the stock market's use of earnings information, Journal of Accounting and Economics, 1996, 319-337**

Another study in the same vein adopted a slightly different (and more rigorous, I think) approach to matching up the properties of stock price with the properties of earnings.

#### **1. The test**

Define

- CAR = the cumulative abnormal return
- SUE = standardised unexpected earnings
- = the change in earnings relative to the equivalent quarter last year, detrended and scaled by standard deviation

We know from prior research (and Bernard & Thomas) that there is a relation between SUE in the form

$$SUE_0 = b_0 + b_1SUE_{-1} + b_2SUE_{-2} + b_3SUE_{-3} + b_4SUE_{-4} + e_0 \quad (1)$$

where  $b_1, b_2, b_3$  are positive,  $b_4$  is negative and  $e_0$  is a random disturbance term

When  $SUE_0$  is announced, then if the market fully understands what drives the SUE process then the market reaction will be

$$CAR_0 = \alpha + \beta \cdot e_0 + \omega_0 \quad (2)$$

where

$\alpha$  and  $\beta$  are constants and  $\omega_0$  is a random disturbance term

But  $e_0$  in equation 2 can be replaced from equation 1 above.

$$CAR_0 = \alpha + \beta \cdot \{ SUE_0 - b_0 - b_1 SUE_{-1} - b_2 SUE_{-2} - b_3 SUE_{-3} - b_4 SUE_{-4} \} + \omega_0$$

$$CAR_0 = \alpha - \beta b_0 + \beta SUE_0 - \beta b_1 SUE_{-1} - \beta b_2 SUE_{-2} - \beta b_3 SUE_{-3} - \beta b_4 SUE_{-4} + \omega_0 \quad (3)$$

If we run equation 1, we can find out the relationship between the SUEs at various lags. If we then run equation 3 we can then identify whether the market fully understands the properties of the SUE process.

If the market fully understands the properties of SUE then the coefficients will take the values in equation 3. However, if the market naively believes that quarterly earnings are a seasonal random walk (as in Bernard & Thomas) where the expectation for a given quarter is what happened 4 quarters ago, then only  $SUE_0$  will be significant; lagged SUEs will not be significant.

## 2. The results

In Table 1 the results of estimating equation 1 are given

	$b_0$	$b_1$	$b_2$	$b_3$	$b_4$	$R^2$
	0.291	0.443	0.133	0.054	-0.215	28.57%
P values	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

This is similar to the Bernard and Thomas finding that the relationship declines as the lag increase, and becomes negative at the fourth lag.

Table 3 gives the estimates of equation 3

	$\alpha - \beta b_0$	$\beta$	$\beta b_1$	$\beta b_2$	$\beta b_3$	$\beta b_4$	$R^2$
	-1.592	4.924	-0.981	-0.333	-0.319	0.231	7.09%
P values	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

The results show that all SUEs are significant, and therefore it is clear that the market does not naively believe in a seasonal random walk. However, the coefficients are too small to be interpreted that the market fully understands the properties of SUE.

For example, take the estimated value of  $\beta b_1 = 0.981$ . Its value, if the market fully understands the SUE process, would be  $4.924 \cdot 0.443 = 2.181$

Therefore the Ball-Bartov evidence is that the market is not so naive as to believe in a seasonal random walk for earnings; however, neither do prices fully reflect the time series properties of quarterly earnings. This supports the notion of post earnings announcement drift.

