

## Does the market impound balance sheet information?

From accounting research we know that the stock market impounds company earnings, and there is clear evidence that the announcement is anticipated. However, it is also reasonably clear that the market does not always understand the full implications of current earnings for future earnings.

The following paper examines whether the market impounds the information in the balance sheet about next period's earnings.

**Ou & Penman, "Financial statement analysis and the prediction of stock returns", *Journal of Accounting & Economics*, Nov 1989, 295-329.**

### 1. In brief

Their results may be summarised as follows.

time -->

$E_{t-1}$  -----  $E_t$

$P_{t-1}$

Pr -----  $P_t$

The Pr variable is called this because it relates to the probability that earnings in the next period will increase. They show when Pr is constructed from balance sheet numbers, it contains information about  $E_t$  which is not contained in  $E_{t-1}$ . Pr is not impounded in  $P_{t-1}$ , but when  $E_t$  is announced, then the information that was in Pr is captured in  $P_t$ . It is as if share prices only reflect information that is contained in earnings, but not that information which is contained in balance sheet numbers.

### 2. The OP experiment

The basic approach is conservative, in that very little thought goes in to the selection of balance sheet items which contain information about future earnings. The data is allowed to speak for itself.

There are a number of key steps in the OP approach.

#### I - SELECTING PREDICTORS WITH UNIVARIATE LOGIT

First, variables (or descriptors) are selected for their ability to predict next period's earnings<sup>1</sup>. Each of the 68 descriptors are tested with a univariate LOGIT model in predicting the sign of next period's earnings change. The estimation periods selected are 1965-1972 and 1973-1977. In both periods 34 variables are significant at the 10% level, and many of the variables are significant in both periods.

#### II - REDUCING THE NUMBER OF PREDICTORS FURTHER WITH MULTIVARIATE LOGIT

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<sup>1</sup> Since inflation causes earnings to drift upwards, throughout their tests, earnings increases are measured net of any drift. The extent of the drift in any given year is measured using data from the previous 4 years.

The second stage uses a multivariate model with only the 34 variables which were significant at 10% in the first stage. These variables are reduced further by selecting only those which remain significant at 10%. This leaves 16 variables for the period 1965-72 and 18 for the period 1973-77.

### III - ESTIMATION OF Pr

For each year in the period 1973-83 an estimate of Pr is made from the multivariate models in the previous step. Pr is estimated from current data, but the coefficients used are estimated from a previous period:

for 1973-77, Pr is estimated from coefficients calculated on 1965-72 data;  
for 1978-83, Pr is estimated from coefficients calculated on 1973-77 data.

Estimated Pr is then used to predict whether next year's earnings will increase or decrease. Two alternative methods are tried: in one, increases are predicted when  $Pr > 0.5$ , and decreases are predicted when  $Pr < 0.5$ ; in another, increases are predicted when  $Pr > 0.6$  and decreases when  $Pr < 0.4$ .

These rules seem to capture some important characteristics of earnings since from Table 4, since on average approximately 62% of the predictions from the 0.5, 0.5 cutoff are correct. The 0.6, 0.4 rule does slightly better in that on average approximately 67% of the predictions are correct. There is very little difference between 1973-77 and 1978-83 and between earnings increases and earnings decreases.

### IV - IS Pr IMPOUNDED IN PRICE?

This is the issue at the heart of the OP test. The experiment they run is twofold: for each year in 1973-83, they take a short position on stocks whose earnings are expected to fall; they take a long position on stocks whose earnings are expected to rise.

The decision to go long or short uses the 0.6,0.4 Pr rule and is taken 3 months after the relevant year end. This should allow for information in the financial statements to be impounded in price<sup>2</sup>.

The performance of the long and short portfolios is measured over 36 months and the results for 10 Pr portfolios are shown below, taken from OP's Table 6.

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<sup>2</sup> This is a conservative assumption since Beaver Lambert, Ryan, "The Information Content of Security Prices", Journal of Accounting & Economics, July 1987 find that earnings information, at least, is impounded in prices by the end of the financial year.

Mean cumulative market-adjusted monthly returns from investment in stocks on the basis of estimated probability of an earnings increase (Pr) 1973 - 1983.

Pr portfolio	Pr values	N	9	12	18	24	36
1	Pr > 0.9	658	0.0118	0.0548	0.0443	0.0633	0.1864
2	0.9 >= Pr > 0.8	928	-0.0201	-0.0031	-0.0129	0.0058	0.0931
3	0.8 >= Pr > 0.7	2174	0.0346	0.0525	0.0576	0.0757	0.1008
4	0.7 >= Pr > 0.6	4359	0.0295	0.0384	0.0545	0.0719	0.1045
5	0.6 >= Pr > 0.5	4802	0.0188	0.0221	0.0330	0.0444	0.0560
6	0.5 >= Pr > 0.4	3007	0.0034	0.0003	0.0000	-0.0013	-0.0083
7	0.4 >= Pr > 0.3	1174	-0.0293	-0.0379	-0.0557	-0.0629	-0.0804
8	0.3 >= Pr > 0.2	417	-0.0430	-0.0625	-0.1072	-0.1098	-0.1171
9	0.2 >= Pr > 0.1	154	-0.0182	-0.0241	-0.0246	-0.0552	-0.1468
10	Pr <= 0.1	84	-0.0991	-0.1109	-0.1604	-0.2185	-0.1881
Hedge portfolio all stocks		9948	0.0577	0.0834	0.1152	0.1453	0.2083

It can be seen that after 24 months, the hedge portfolio has earned 14.53% more than the market. Although there are returns to anticipating earnings rises, it can be seen that much of the excess returns are generated by anticipating earnings declines. This suggests that the market is poorer at impounding bad news (information about earnings declines) than good news.

One slightly worrying aspect of the results is that the excess returns continue after 24 months; after 36 months the excess returns are 20.83%. Pr is intended to capture information in the balance sheet about next period's earnings (12 months away from the portfolio formation), and therefore it is surprising that this information is still being impounded 24 months after the earnings announcement.

### V - IS PR CAPTURING RISK - IS A BUCKET HALF FULL OR HALF EMPTY ?

One of the advantages that OP claim for their experiment is that it allows the data to speak for itself. The approach is conservative; past data is simply used to predict the future. However, from another aspect, this approach has a distinct disadvantage since it is not clear what Pr is capturing. Perhaps, Pr varies with risk, particularly if excess returns continue after 36 months.

In Table 7, OP correlate Pr with firm characteristics to examine if risk is captured. They find that:

high (low) Pr values are associated with a rise (fall) in next period's earnings (this is expected, since the function of Pr is to identify earnings change;

high (low) Pr values are associated with negative (positive) earnings change in the current year, suggesting that companies predicted to have an increase (decrease) in earnings next period, have falling (rising) earnings in the current period;

high (low)  $P_r$  values are associated with negative (positive) market adjusted returns over the 24 months prior to the portfolio formation, suggesting that companies predicted to have an increase (decrease) in earnings next period have performed relatively poorly (well) in the recent past;

high (low)  $P_r$  values are associated with low (high) E/P values, suggesting that companies predicted to have an increase (decrease) in earnings next period have a relatively low (high) earnings to price ratio, that is are “value” (“glamour”) stocks. This is similar to the evidence of Lakonishok, Shleifer and Vishny, “Contrarian investment extrapolation and risk”, Journal of Finance, December 1994 that value stocks outperform glamour stocks over a period of about 5 years.

high (low)  $P_r$  values are associated with low (high) market to book value ratios

high (low)  $P_r$  values are associated with relatively small (large) companies by market value.

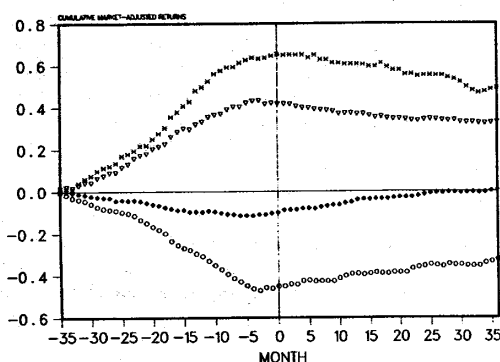


Fig. 2. Mean cumulative market-adjusted returns from 35 months prior to  $P_r$  portfolio formation month, month 0, to 36 months after  $P_r$  portfolio formation month, for selected  $P_r$  portfolios, 1973–1982;  $\circ$   $P_r > 0.8$ ,  $\phi$   $0.6 < P_r \leq 0.8$ ,  $\nabla$   $0.2 < P_r \leq 0.4$ ,  $\times$   $P_r \leq 0.2$ .

Generally, OP find that companies in the high  $P_r$  portfolio, with predictions of an increase in earnings for next period, are those companies not having done so well in the past. This is illustrated in the above figure taken from the OP article. But, high  $P_r$  values are **not** associated with beta prior to the portfolio formation period.

Whether or not these factors can be attributed to risk is a difficult question. It depends on your viewpoint. For example, Fama & French find that returns are associated with size and book to market. They conclude that because these factors are priced by the market, they also capture risk. However, in the absence of a theory to explain *why* the factors capture risk, they could be simply capturing the OP effect.

The story itself seems relatively clear. Companies which are performing relatively poorly (both in terms of earnings and returns) tend to have a reversal of their fortunes. Information about this reversal is captured *in advance* by the financial statements. The companies then exhibit above average performance. However, the interpretation is a little more difficult.

Ī The OP story is that the market is late at recognising this reversal, and therefore excess returns may be made.

I The alternative story is that companies initially have low returns probably due to low risk and poor earnings. The profile of the company then changes, and this is (contemporaneously) captured by the financial statements. The company now has relatively good earnings but high risk and therefore exhibits high returns. One serious problem with this explanation is the problem of benchmarking. Why is it that all of the returns to be made are attributable to increased risk? Are not at least some of the returns generated by the company attributable to increased performance which is signalled by the financial statements?

In order for the alternative explanation to be a serious rival to the OP story, it is necessary to be much more specific about the risk compensation required by the market in relation to the book to market and size factors.

### 3. What is driving the OP results?

Even if we accept that the OP results are not entirely driven by risk, what explanation may be given for them? We explore some possibilities here very briefly.

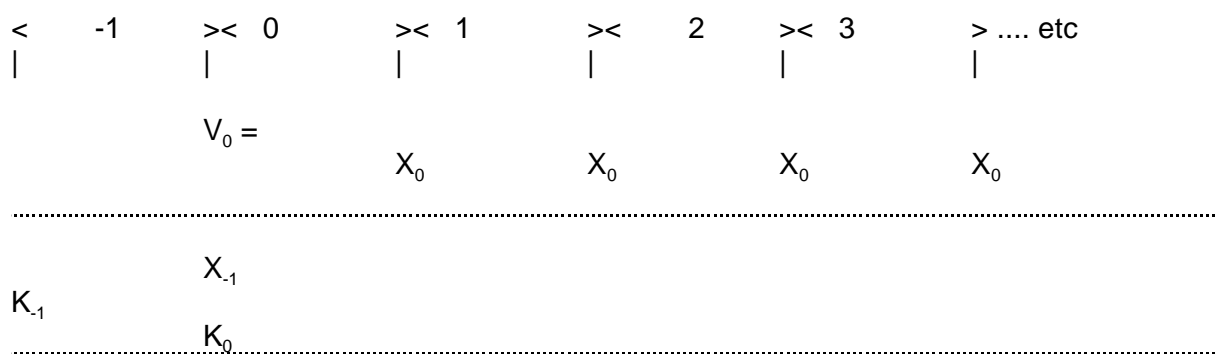
#### I - EARNINGS MANIPULATION

One possible explanation relates to the way in which accounting earnings are sometimes manipulated. Typically, earnings are manipulated by transferring some of the revenue or costs to another accounting period. The technique for achieving this is to store the item temporarily in the balance sheet. For example, when a company makes an excessive provision current profit will be lower and current liabilities will be higher than otherwise. In subsequent years, when the unused part of the provision is written back, then profit will be higher than otherwise.

In this situation, the excessive liabilities in the balance sheet will contain information about future profits.

#### II - ESTIMATE OF SUSTAINABLE CASH FLOWS

A second possible explanation, is derived from the MM61 valuation model. One component of the model is sustainable cash flow,  $X_0$ , from the existing capital base,  $K_0$



But the latest earnings information for the company will be  $X_{-1}$  relating to period -1; and this will have been generated by the capital stock at the beginning of period -1,  $K_{-1}$ . Therefore an estimate of  $X_0$  might be constructed by assuming that expected rate of return on capital remains the same as before:  $X_0 = X_{-1} \cdot \{K_0 / K_{-1}\}$ . Therefore, the estimate of  $X_0$  should contain some balance sheet information. But investors may inappropriately use  $X_{-1}$ , and they may only catch up when earnings are announced in the following period.

### III - THE ECONOMICS OF THE FIRM

A third explanation of the Ou and Penman results may relate to the underlying economics of the firm. For example, during a recession manufacturers may find that stocks are rising because consumers are failing to purchase goods; that is, changes in stocks may contain information about future sales (and therefore profits).

Since the OP paper caused a significant amount of interest, the results were investigated by other researchers. The paper by Stober, summarised below, is one which focussed on what factors might be behind the OP results.

## Stober, "Summary financial statement measures and analysts' forecasts of earnings", *Journal of Accounting & Economics*, 1992, 347-372

### 1. The contribution

The contribution of Stober is twofold:

He attempts to assess whether  $Pr$  is omitted from the market's expectations, by examining the relationship between  $Pr$  and IBES analysts' forecasts of next year's earnings.

He follows the excess returns for 72 months after the portfolio formation.

### 2. Key results

The key results are given in his Table 5, part of which is reproduced below.

Performance of the  $Pr$  strategy in the I/B/E/S sample, giving each financial statement year equal weight; 1975- 1983.

Position	24 months ending with month 0	Cumulative size-adjusted monthly returns over the holding period From the end of month 0 to the end of month						
		12	18	24	36	48	60	72
<b>Panel A: All cases in the I/B/ES sample</b>								
Stocks with $Pr > 0.6$	-0.1582	-0.0122	-0.0348	-0.0343	-0.0504	-0.0297	0.0135	0.0281
Stocks with $Pr < 0.4$	0.2207	-0.0308	-0.0762	-0.0763	-0.0861	-0.1118	-0.1245	-0.1732
Hedge position	-0.3789	0.0186	0.0414	0.0420	0.0358	0.0820	0.1380	0.2103
<b>Panel B: Cases where the predictions of <math>Pr</math> and those of analysts' forecasts agree</b>								
Stocks with $Pr > 0.6$	-0.1655	-0.0144	-0.0343	-0.0370	-0.0595	-0.0487	-0.0132	-0.0074
Stocks with $Pr < 0.4$	0.1454	-0.0271	-0.0520	-0.0377	-0.0503	-0.0560	-0.0467	-0.0576
Hedge position	-0.3109	0.0127	0.0177	0.0008	-0.0091	0.0073	0.0335	0.0603
<b>Panel C: Cases where the predictions of <math>Pr</math> and those of analysts' forecasts disagree</b>								
Stocks with $Pr > 0.6$	-0.1049	0.0143	-0.0414	-0.0429	-0.0547	-0.0014	0.1097	0.1977
Stocks with $Pr < 0.4$	0.3363	-0.0291	-0.1071	-0.1461	-0.1768	-0.2066	-0.2300	-0.2414
Hedge position	-0.4417	0.0434	0.0658	0.1082	0.1221	0.2051	0.3397	0.4391

### 3. Interpretation and comment

First of all, Stober gives credence to the idea that the market does not impound the balance sheet information. The reason for this is that the hedge position size adjusted returns after 24 months are 0.0008 when analysts forecasts agree with the Pr forecasts (Panel B), but 0.1082 when analysts forecasts do not agree with the Pr (Panel C). This suggests that Pr is capturing some information that is not impounded in price (at least by analysts)

However, the second component of Stober's evidence is that Pr is reflecting risk. He believes this because the abnormal returns continue for 72 months after the portfolio formation. But as mentioned above, this really is an open issue. The table above shows, similar to OP, that stocks that do well in holding period have poor stock price performance in the prior 24 months. For example in Panel C, stocks that are predicted to have a decline in earnings ( $Pr < 0.4$ ), have had size adjusted returns of 0.3363 during the 24 prior months. In contrast, stocks that are predicted to have an increase ( $Pr > 0.6$ ) have size adjusted returns of -0.1049.

This suggests that the increase in earnings next period is not just a one-off event, being something that the market has just happened to have missed. It is part of a systematic realignment of the stock price taking place over a longer period. The information in the balance sheet is probably ignored because of the way the market is conditioned to viewing that company's performance. Current performance is not mapped effectively in to future performance. Financial fashions change slowly<sup>3</sup>, and the market only gradually changes its perception of the company's economic performance. Other evidence also suggests that such realignments take place<sup>4</sup> over 4-5 years.

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<sup>3</sup> See the discussion notes on Bikhchandani, Hirshleifer & Welch, "A theory of fads, fashion custom and cultural change as informational cascades", *Journal of Political Economy*, 1992, 992-1026.

<sup>4</sup> For example, see (i) De Bondt & Thaler, "Further Evidence on Investor Overreaction and Stock Market Seasonality", *Journal of Finance*, July, 1987 and the paper mentioned above (ii) Lakonishok, Shleifer and Vishny, "Contrarian investment extrapolation and risk", *Journal of Finance*, December 1994.