Is Overreaction/Underreaction chosen by managers? Evidence from Greece.

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Abstract

This paper models overreaction/underreaction as being the outcome of company managers' choices to manipulate earnings in response to perceived mis-pricing of their company. One of the more prominent attempts to reconcile observed short-term overreaction and consequent secular underreaction to earnings news interprets earnings announcements as "selective" events. In financial markets events are "selected" when contrived in response to perceived asset mis-pricing.

We interpret earnings management by managers as a process requiring a selection of earnings in response to perceived mis-pricing of their corporation's stock. Post earnings announcement drift is then interpreted as one consequence of this form of managerial choice. We devise and test a trading strategy, implemented at the earnings announcement date, based on the level of discretionary accruals in relation to past mis-pricing. The profitability of such a strategy is tested and conclusions for attempts to reconcile short-term overreaction with secular underreaction are drawn.

KEYWORDS: underreaction, selective earnings, earnings announcements, perceived mis-pricing.

1 Introduction

This paper models overreaction/underreaction as being the outcome of company managers choices to manipulate earnings in response to perceived mis-pricing of their company. One of the more prominent attempts to reconcile observed short-term overreaction and consequent secular underreaction to earnings news about the same stock regards earnings announcements as "selective" events (Daniel, Hirshleifer, and Subrahmanyam (1998)). A selective event is one chosen, or managed, to some degree by those responsible for its occurrence. In financial markets events are "selected" when contrived in response to perceived asset mis-pricing. Examples being IPO's or seasoned equity offerings (see for example Teoh, Welch, and Wong (1998) and Shivakumar (2000)). If this attempted reconciliation is to explain post-earnings announcement drift (PEAD) then companies showing greater evidence of earnings "management" might be expected to display greater overrreaction/underreaction than companies that do not. This hypothesis is tested in this paper and conclusions for attempts to reconcile short-term overreaction with secular underreaction are drawn.

The presence of a prolonged period of market adjustment to publicly available information, in the form of PEAD, seems an anomaly "above suspicion" even to the most ardent efficient markets advocates, such as Fama (1998). And yet competing explanations of its presence seem both ad-hoc in their assumptions and partial in their interpretation of data. If behavioural explanations of financial markets are ever to be more than "anomalies dredging" (Shefrin (1989)) some coherent model of how the market processes information in the presence of cognitive bias is needed. Otherwise one is left with "a menu of behavioral patterns that can be mixed and matched to explain specific models" (Fama (1998)). One attempt to provide a generalised model of the response of financial markets to news about a company's prospects has been developed by Daniel, Hirshleifer, and Subrahmanyam (1998) (henceforth DHS). We employ this framework here to investigate the degree and cause of observed PEAD in the Greek stock market.

Evidence that changes in earnings may at least be anticipated by company management is provided by Ke, Huddart, and Petroni (2003). Ke, Huddart, and Petroni (2003) show managers personal trades in their company's stock anticipate reversals of fortune in earnings growth for up to nine quarters ahead. Beneish and Vargus (2002) similarly show that hedged returns to accruals based trading strategies are enhanced by conditioning upon managers personal trades, suggesting managers undertake accruals management to enhance the value of their own share-holding in their employer.

We use the Greek stock market as a test bed for the idea that PEAD is a response to an event chosen by the managers of the firm. This is because of the relatively lax accounting regulatory environment in Greece and relative prominence of individual investors in Greek market. Evidence from the United States regarding the role of individual investors in generating PEAD is mixed. Bartov, Krinsky, and Rasakrishnan (2000) report evidence supporting the view that individual investors drive PEAD. Individuals are more likely, than professional traders, to trade on "noise" in stock prices; which arises regardless of changes in that stock's true, fundamental value (Black 1986). This view is also supported by Bird, Choi and Yeung (2014), but Hirshleifer, Myers, Myers, and Teoh (2002) have cast doubt on this conclusion[1].

Reviewing various aspects of earnings "opacity" for 34 countries in the years 1984-1998 Bhattacharya, Daouk, and Welker (2003) report Greece ranks in the least transparent group on all three measures used by the authors, earnings aggressiveness, loss-avoidance and earnings smoothing. To help resolve this matter we focus on a rapidly developing security market where casual empiricism suggests individual investors have had a large role in a speculative market. Prior research already suggests the Greek market may be inefficient at the weak-form sense Dokery and Kavassanos (1995).

Greek companies appear to engage in some of the most extreme earnings manipulation practices in the world. Leuz, Nanda, and Wysocki (2003) argue that this world-beating level of earnings management results from high private benefits control acquired under a legal regime

[1] Cohen, Gompers, and Vuolteenanaho (2001) present evidence to suggest institutional investors actively exploit individual investors' underreaction to good news, although their results have other interpretations as well, as they point out.

where investor protection by the law is weak. Our discussions with market professionals in the Greek market confirm minority shareholder rights, especially in the face of an entrenched family interest, are weak. Often the lack of effective regulation to control insider trading appears to induce slightly conspiratorial ambiance to the "Sophokleous Steeet" culture in Athens[2].

The paper proceeds as follows, the next section gives a brief verbal exposition of the DHS model. Readers are referred to the original paper for details. A third section links company management's choice of accrual, or at least the discretionary element in accruals, to PEAD. Here we argue that earnings announcements are partially "selective" events chosen by company management in response to perceived mis-pricing. A fourth section presents our results and a final section concludes the paper.

2 Earnings announcements as responses to market mis-pricing

DHS have advanced a perfectly general model of the stock market's response to company news. This model incorporates the possibility of both short-term overreaction and consequent secular underreaction, of the type we see in the PEAD context. The model envisages two types of traders, informed and uninformed, trading a risky asset over four dates. At date zero each agent receives an endowment. At date 1 the informed only receive a noisy private signal about the value of the asset. At date 2 a second noisy signal arrives. Finally, at date 3 the value of the asset is revealed by the receipt of conclusive public information.

DHS investigate two variants of their model. In the first the signal at date 2 is public. It is the second variant of the model, in which the date 2 signal is a private signal, received by managers of the firm alone, that we investigate here. Both versions of the model imply the presence of short-term overreaction, followed by secular underreaction. The difference between the first and second version of the model is that in the second managers choose the signal to send to investor's in

[2] The term is Greek equivalent of Wall Street in the US.

response to perceived mis-pricing. It is this second version of the model which predicts the occurrence of PEAD. This implies at least two testable hypotheses:

- managers can/will choose to manage announcements about earnings in response to perceived mis-pricing of the company,
- the degree of stock market overreaction/underreaction to earnings information is influenced/selected by managers in choices about how to signal the private information they receive at date 2.

We test these propositions below. We do so by drawing on the now extensive literature on earnings management. Details of our test method are given in the next section.

3 Earnings management and PEAD: an empirical test

If the DHS model of earnings as a selected event is to be a useful explanation of PEAD it is necessary to show managers choose earnings in response to a perceived market mis-valuation of their stock. This section outlines such a test and the next section implements it.

Suppose that a company's management have some degree of discretion over what earnings figure to report, exercised by means of accounting pol- icy choices within the bounds of Generally Accepted Accounting Practice. Such discretion might be exercised by attitudes towards revenue recognition, bad debt provision, asset depreciation, or inventory valuation. The accounting literature now reports a large literature on "accrual manipulation", its correct measurement and interpretation (see Kothari (2001), especially p. 161-167, for a review of the literature). Burgstahler and Dichev (1997) and Burgstahler and Eames (2003) present evidence regarding earnings management and analysts (in)ability to capture its effect in their forecasts. These authors confirm the failure of analysts to fully anticipate the earnings management process undertaken by managers as the earnings announcement approaches.

This paper uses the accrual manipulation technology to judge the extent to which earnings are a selective event, indicating a response by company management to perceived mis-pricing. Obviously ideally the "selective" nature of the earnings event would be judged relative to some direct indicator of the degree to which company management regard their particular stock as being mispriced. Possible indicators of such private perceptions of mis- pricing are senior managers own share dealings. Ke, Huddart, and Petroni (2003) show that managers both anticipate and act upon reversals of earnings growth, trading in their own stock in response to anticipated changes of fortune. Unfortunately such data is not currently available for Greek firms. Hence we judge the degree of mis-pricing using the price-earnings (henceforth $\frac{P}{E}$ ratio) at the beginning of the year earnings are announced. In reality this at the beginning of the year earnings are announced. In reality this is a semi-public signal, made private only by managements' better ability to anticipate earnings. Recall for earnings to be a "selective" event they must be chosen in response to mis-pricing. In particular managers must choose reported earnings in response their perception of mis-pricing of the company stock. Earnings are a selective event in our test if discretionary accruals are positive following a period when the $\frac{P}{E}$ ratio has been relatively low, or conversely, discretionary accruals are low following a period in which the $\frac{P}{E}$ ratio has been high. So we allocate stocks to two portfolios reflecting manager's response to perceived mis-pricing as follows:

$$\text{Select} = \begin{cases} High,\ If\ prior\ \frac{P}{E}\, in\ lowest\ third\ and\ Discretionary\ accruals\ in\ highest\ third \\ Low,\ If\ prior\ \frac{P}{E}\ in\ highest\ third\ and\ Discretionary\ accrual\ in\ lowest\ third \end{cases}$$

The basic trading rule is then to buy low $\frac{P}{E}$ / high discretionary accruals stocks, funding the purchase by selling short high $\frac{P}{E}$ / low discretionary accruals stocks. The strategy buys stocks where management signals undervaluation by boosting earnings, via accruals management, funding the purchase by sales of stocks where managers choose to depress earnings. Accruals based earnings manipulation is seen here as a technique by which management can reduce the asymmetry between their own information set and that of investors in the company. We refer to this hereafter as a mis-valuation/accrual based strategy. The strategy is diagrammatically represented below.

		Discretionary Accrual	
		High	Low
Prior	High		SELL
$\frac{P}{E}$	Low	BUY	

Total accruals are decomposed into discretionary and non-discretionary components and companies with high discretionary accruals in absolute terms, conditional on past mis-pricing, are regarded as exhibiting a response by company management to a perceived mis-pricing of the stock.

3.1 Accruals benchmarks

The pricing, or mis-pricing, of accruals has already generated a considerable literature (eg. Bradshaw, Richardson, and Sloan (2001), Defrond and Chul (2001), Sloan (1996), Subramanyam (1996), Xie (2001)), but this is the first to our knowledge to directly link accruals to PEAD. Our mis- valuation/accrual based valuation strategy is thus consistent with, but not a direct implication of, prior literature on the mis-pricing of accruals.

We use an accruals definition suggested by Peasnell, Pope, and Young (2000). Our results give precedence to the Peasnell, Pope, and Young (2000) benchmark in the belief that manipulation of earnings through accelerated/decelerated depreciation of fixed assets is a somewhat transparent, and hence ineffective, means of manipulating earnings for most firms.

Working-capital accruals (WCA_t) (or at least their non-discretionary component) are modelled as the difference between reported earnings and cash-flow from operations. Cash-flows are working capital from operations less changes in inventory and receivables, plus changes in accounts payable and income taxes payable, i.e.

$$NWCA_t = (\Delta STOCK + \Delta DEBT\ ) - \Delta CREDIT + OTHER$$

$$= (REV - COGS - BDE) + (CPS - CRC) + OTHER$$

$$sm * REV\ C - cm * CRC + OTHER$$

$$\Delta STOCK \ \equiv PUR - COGS$$

$$\Delta DEBT \equiv REV - CRC - BDE$$

$$\Delta CREDIT \ \equiv PURS - CPS$$

where NWCA is non-discretionary working-capital accruals, STOCK de- notes stocks, DEBT is debtors net of any applicable bad debt allowance, CREDIT is creditors, OTHER is all non-cash current assets apart from stocks and trade debtors as well as all liabilities apart from creditors, REV is revenue from total sales, CPS is cash paid to suppliers, CRC is cash received from customers (proxied here by revenues minus trade debtors), sm is the gross margin on recorded sales, cm is the gross cash contribution on cash collections and customers, COGS is the cost of finished goods sold, BDE is the bad debt expense, PUR is purchases of materials.

We follow Peasnell, Pope, and Young (2000) in not explicitly modelling non-cash current assets so the estimated form of the model of non-discretionary working capital accruals becomes

$$\frac{NWCA_t}{TA_{t-1}} = \lambda 0\left(\frac{1}{TA_{t-1}}\right) + \lambda 1\ \frac{REV_t}{TA_{t-1}} + \lambda 2\ \frac{CRC_t}{TA_{t-1}} + \varepsilon_t \qquad (1)$$

Jones (1991) suggests an alternative model to capture movements in total non-discretionary accruals, as opposed to working capital, accruals, allowing the residuals from the model to proxy for discretionary accruals. The Jones (1991) model represents non-discretionary accruals as a function of firm size, revenue and investment in fixed assets. Hence discretionary accruals are simply the residual from the regression

$$\frac{NDA_t}{TA_{t-1}} = \alpha_1 \left(\frac{1}{TA_{t-1}} \right) + \alpha_2 \frac{\Delta REV_\tau}{TA_{t-1}} + \alpha_3 \frac{PPE_\tau}{TA_{t-1}} + \varepsilon_t \qquad (2)$$

where NDA denotes non-discretionary accruals, TAt−1 lagged total assets, ΔREV, changes in total revenue, PPE, gross plant property and equipment and, finally, s_t, the error in equation (2) proxies for discretionary accruals. We do not modify the Jones model, in accordance with DeChow, Sloan, and Sweeney (1995). The DeChow, Sloan, and Sweeney (1995) modification implies all changes in receivables are discretionary which seems an unlikely in the Greek context where payment systems are sluggish. Company managers are likely to exercise some discretion over revenue recognition and so sales revenue. But they can do little to pressurise tardy payers within the Greek legal system. Hence to regard receivables as entirely discretionary seems somewhat heroic in this context.

3.2 Implementing the misvaluation/accrual based trading strategy

To capture the degree to which earnings are a selective event, controlled by management in response to perceived mis-pricing, stocks are ranked at each earnings announcement date by the value of discretionary accruals, or ε_t from equation (1) or (2), conditional on last year's $\frac{P}{E}$. From this point onwards the test proceeds in a manner similar to standard tests for the presence of PEAD (see Bernard and Thomas (1989), Bernard and Thomas (1990), Bernard (1993), Liu, Strong and Xu (2003)) where the misvaluation/accrual based trading strategy replaces the standard measures of earnings surprise as the ranking variable. Instead of basing the trading strategy on good or bad news about earnings the mis-valuation/accrual trading strategy is followed instead. Companies with relatively low $\frac{P}{E}$ ratios (i.e. in the lowest third of the sample) and high discretionary accruals (i.e. in the highest third of the distribution) are placed in a portfolio for purchase while stocks with relatively high $\frac{P}{E}$ ratios and low discretionary accruals, conditional on high prior price-earnings ratio, are placed in a portfolio for sale. We then report the net return to the implied trading strategy.

The effect of accrual movements on post-earnings-announcement drift is captured by means of a regression incorporating a shift to allow for extreme accrual outcomes, conditional on the prior price-earnings ratios. Such regressions already have a history of use in research on the rationality analysts' forecasts of earnings and other areas (Easterwood and Nutt (1999)). The regression takes the form:

$$CAR_{jt} = \alpha + \gamma_{LOW}.LOW.DA_{jt} + \gamma.DA_{jt} + \gamma_{HIGH}.HIGH.DA_{jt} + \varepsilon_{jt} \qquad (3)$$

where DA_{jt} are discretionary accruals calculated according to one of our two preferred benchmark models, Peasnell, Pope, and Young (2000) (denoted DA-PPY in the tables we report) and Jones (1991) (denoted DA-J in the tables we report). LOW is a dummy variable set equal to one if the company/year observation lies in the bottom third of that year's discretionary accruals and the top third of prior $\frac{P}{E}$ ratios and zero otherwise. HIGH is a dummy variable set equal to one if the company/year observation lies in the top third of that year's discretionary accrual observations and the lowest third of prior P ratios, or zero otherwise. Finally, γHIGH is a coefficient on those observations taken from company years in the highest third of all observations on discretionary accruals, while ranking in the lowest third of prior $\frac{P}{E}$ ratios. γLOW is a coefficient on those observations taken from company years in the lowest third of all observations on discretionary accruals, while ranking in the highest third of prior $\frac{P}{E}$ ratios. We use groups of a third here rather than quartiles to present individual yearly high/low accrual groups becoming too small and so uninformative.

Essentially the LOW/HIGH dummies capture the impact of switching in- vestment between portfolios, based on the misvaluation/accruals based trading strategy at the earnings announcement date.

We test our hypotheses by means of the validity of coefficient restrictions imposed on equation (3) above. In particular we test the restrictions:

γLOW $\neq$ γHIGH and γLOW = γHIGH = 0. Both γLOW and γHIGH act as shift coefficients on the γ to capture the response of returns to discretionary accrual manipulations in response to prior mis-pricing. A profitable mis-valuation/accrual based trading strategy implies γHIGH > γLOW , where each coefficients is added/subtracted from γ in regression equation (3) to determine the total effect of accrual manipulation in each state.

PEAD is measured by the path of cumulative abnormal returns (CAR's) after the earnings announcement has been made. So we calculate CAR's from the earnings announcement date, cumulating returns each day for each ten day window over a 3 month investment horizon. PEAD occurs when "good news" firms, those with positive discretionary accruals but low prior $\frac{P}{E}$ are observed to have consistently positive returns in the period after the earnings announcement and conversely "bad news" firms experience negative returns. The abnormal return AR_{jt}, for each of our j firms on each day, is the given by one of two benchmarks

$$AR_{jt}^{MA} = R_{jt} - RM_t$$

$$Or \qquad AR_{jt}^{FF} = Rjt - [\,\hat{\alpha} + \hat{\beta}\,RM_t + \hat{\gamma}\,SMB_t + \hat{\delta}\,HML_t]$$

$$CAR_{p=1,t=1}^{P,T} = \sum_{jt} \frac{AR_{jt}}{N_P} \qquad (4)$$

where AR_{jt} = abnormal return for firm j on day t,

AR_{jt}^{MA} = denotes the market-adjusted-abnormal return and AR_{jt}^{FF} the Fama-French estimate of the abnormal return, (see the Appendix on benchmark models for details)

R_{jt} = the raw return on firm j's stock on day t,

RM_t = the mean-return for day t on a market index for the Athens Stock market, a value-weighted index,

HML_t is the difference in return between a portfolio of the highest book to market ratio stocks in Greece and the lowest,

SMB_t is the difference in return between a portfolio of the smallest and biggest stocks, ranked by market value, in Greece and, finally, $CAR_{p=1,t=1}^{P,T}$ is the sum of the pth portfolio (good or bad news, high or low accruals) abnormal return up to day T after the earnings announcement and N_p is the number of stocks in the pth portfolio. We capture significance using a t-value of the for

$$t_p = \frac{CAR_{p=1,t=1}^{P,T}}{\sigma_p} \quad (5)$$

where σ_p, the standard deviation of returns, is constructed from returns taken over 30 days, starting 10 days prior to the earnings announcement. This is to control for any incremental variance in returns arising from the announcement of earnings.

The degree to which the earnings announcement is selected/managed by company managers in response to perceived stock market mis-pricing of the firm is tested by examining the correlation between the average value of ε_t in equation (1) or (2) for portfolio p and CAR_p in equation (4). A high correlation denotes companies experiencing high PEAD are companies where earnings are being selected/managed by company managers in response to their perception of mispricing.

3.3 Earnings selection or earnings surprise as drivers of PEAD

In order to distinguish between selection of earnings by managers and a large earnings surprises as drivers of PEAD we compare the trading profits from a strategy based on a misvaluation/accruals based trading strategy and a more traditional strategy based on earnings surprises, i.e. the normal trading strategy considered in the literature (see for example Bernard and Thomas (1989)). This profitability of such a strategy may be assessed by a regression of the form:

$$CAR_{it} = \alpha + \beta_{BAD}.BAD.SURP_{jt} + \beta.SURP_{jt} + \beta_{GOOD}.GOOD.SURP_{jt} \quad (6)$$

$$Where\ SURP = \frac{E_{jt} - F_{jt}}{\sigma_E}$$

where BAD is a dummy set equal to one where the earnings surprise is in the most pessimistic third of all observations that year and zero otherwise, GOOD is a dummy set equal to one where the earnings surprise is in the most optimistic third of all observations that year and zero otherwise, βGOOD captures the stock market response to good news about earnings and βBAD captures the stock market response to bad news about earnings.

Our chosen proxy for the "earnings surprise" used in traditional studies of PEAD is the difference between the most recent forecast issued by an analyst for a particular stock and the announced earnings-per-share. We use I/B/E/S measures[3] of both forecast and actual earnings because of now well document differences in the definition of earnings used by commercial databases Abarbanell and Lehavy (2000), Bradshaw, Moberg, and Sloan (1998). The forecast error is normalised on the standard deviation of earnings during our sample period 1992-2000.

The incremental impact of extreme accruals in inducing PEAD is examined by means of a regression incorporating both effects:

$$CAR_{jt} = \alpha. + \gamma_{LOW}.LOW.DA_{jt} + \gamma.DA_{jt} + \gamma_{HIGH}.HIGH.DA_{jt}$$

[3] We use the Detailed History CD for the relevant period.

$$+\beta_{BAD}.BAD.SURP_{jt} + \beta.SURP_{jt} + \beta_{GOOD}.GOOD.SURP + \varepsilon_{jt} \qquad (7)$$

where BAD is a dummy set equal to one where the earnings surprise is in the most pessimistic third of all observations that year and zero otherwise, GOOD is a dummy set equal to one where the earnings surprise is in the most optimistic third of all observations that year and zero otherwise, $SURP_{jt}$ is the difference between actual earnings and the most recently issued forecast, for each sample firm each year, divided through by the standard deviation of that firm's earnings in the years 1992-2000. The coefficient γHIGH is a coefficient on those observations taken from company years in the highest third of all observations on discretionary accruals, while ranking in the lowest third of prior $\frac{P}{E}$ ratios. γLOW is a coefficient on those observations taken from company years in the lowest third of all observations on discretionary accruals, while ranking in the highest third of prior $\frac{P}{E}$ ratios. The coefficient βBAD is a coefficient on those observations taken from company/years in the most pessimistic third of all observations on earnings surprises (recall we define the numerator as actual minus the most recent forecast), βGOOD is a coefficient on those observations taken from company/years in the most optimistic third of all observations on earnings surprises.

As before we test the incremental power of accruals to explain the drift by the imposition of linear restrictions on equation (7). Here we test:

γ = γLOW = γHIGH = 0 and β = βGOOD = βBAD = 0 to discern the relative contribution of mis-valuation driven discretionary accruals choices and earnings surprises in driving PEAD.

The final test of the profitability of a misvaluation/accruals based trading strategy will however will be in determining the reliability and size of trading profits derived from that strategy. This is done by means of comparison of portfolio returns to a traditional earnings-surprise based trading strategies with our alternative misavaluation/accrual based trading strategy.

4 Data

The data concerning Greek sample company's financial accounts were collected from the official archives of the Athens Stock Exchange (ASE). Data is provided by ASE in the form of Excel-spreadsheets. We extracted data for both the Profit and Loss and Balance Sheet accounts for all firms. For the final tests relating PEAD to discretionary accruals we select only companies with a complete set of accrual items, earnings, earnings announcement dates and stock prices required to undertake our tests. Furthermore we exclude all financial institutions e.g. banks, insurance companies, investment trusts, etc, because of their distinct accounting practices.

A separate, somewhat differently defined sample of firms was isolated for the construction of benchmark models of non-discretionary accruals. Following Peasnell, Pope, and Young (2000) we estimate cross-sectional non- discretionary accruals benchmark models only for industries with more than 8 firms with a complete set of accruals data. This reflects a slight relaxation of the Peasnell, Pope, and Young (2000) sample restriction which required 10 firms per sector. In our study this has the effect of allowing entry of firms in the Chemicals sector. Cross-sectional models of discretionary accruals are preferred because of existing evidence of their greater ability to identify firms engaging in accrual manipulation.

In order to study PEAD we collected earnings-announcement dates from the Greek financial press. Over half the reported earnings announcement dates were found in the weekend's newspapers, with the largest number of announcements being made on a Sunday. Since financial markets are closed on the weekend in Athens some allocation of these announcement to trading days, i.e. Monday to Friday, had to be made. The procedure followed here is to allocate Saturday's and Sunday's announcement to the following Monday and all public holidays' trading to the following day. This procedure although ad hoc seeks to capture the reality of earnings disclosure in the Athens market. While news about earnings are relayed to the financial press on the day it occurs it only appears in main data bank used by investment banks for allocating investments the next day.

In interpreting daily stock market responses to the release of information in the Athens exchange the effect of price-limits upon movements in excess of 8% per-day, which were in place during our sample period, (but no longer) should be recalled. Since August 1992 daily movements in prices above or below 8% have been curtailed by the Athens Exchange in response to fears concerning excessively volatile stocks. In a study of the impact of such restrictions Phylaktis, Kavussanos, and Manalis (1991) suggest their impact may favor intervention by informed block-traders. Such sophisticated traders can gull naive momentum investors into the entering market, by repeatedly ramping a stock to its daily limit and then dumping the stock at point of their choosing. In such circumstances a rapid but uneven diffusion of information is to be anticipated, with much activity concentrated in a few block trades.

5 Results

5.1 Estimates of benchmark models

Table 1 give estimates of the model of non-discretionary working-capital accruals suggested by Peasnell, Pope, and Young (2000). In two of seven sectors, Textiles and Miscellaneous, the model seems to have little power to capture variation in non-discretionary accruals, an F-test for the restric- tion that all the coefficients in the model are zero is accepted at the 95% confidence interval for these two sectors. A simple R-squared statistic is not reported here because the absence of an intercept term from the model makes that statistic invalid. Comparing the sign and magnitude of the coeffi- cients obtained with those of the original paper the results seems comparable, apart from in the intercept term which reflects our decision to scale by total assets. The coefficient on revenues is large and positive, consistent with Peasnell, Pope, and Young (2000) original results[4]. However the coefficient on cash-received is negative in only five of our seven industries, (Textiles and Miscellaneous being exceptions once more) whereas in the original Peasnell, Pope, and Young

[4] The comparison here is with the right-hand panel Table of Table 2, p 321, of the original Peasnell, Pope, and Young (2000) study.

(2000) all industries had a negative coefficient. Overall variation in working capital accruals seems to be captured pretty well by the Peasnell, Pope, and Young (2000) framework. This is important if it is to serve as an effective benchmark for calculating discretionary working-capital accruals. Recall that our estimate of discretionary accruals, conditional on prior $\frac{P}{E}$ ranking, is our proxy for that part of announced earnings which is "selected" by managers. Hence sharper estimates of discretionary accruals will enable more powerful tests of our principle hypotheses.

Table 2 reports the discretionary working-capital accruals implied by our estimates of the Peasnell, Pope, and Young (2000) model, i.e. ε_t from equation (1) on an annual basis. We note considerable industrial and inter-temporal variation. Figure 1 captures the inter-temporal variation within increases in reported earnings, due to smoothing of discretionary working-capital accruals, being clustered in the year 1999. This is particularly true of the Construction, Textiles and Miscellaneous sectors. There appears to have been a marked smoothing forward of income in 1999, possibly associated with changes for the better in the Greek political and economic climate. By 1999 Greece's prospect of more speedy inclusion within the European Union were clear to investors and a stock market boom was well underway. The surge in accruals also coincides with a period when the 1990's boom had begun to fade and investors needed re-assurance their money was safe.

The upsurge in accruals in 1999 may reflect managers desire to signal the improvement in trading conditions expected to arise from these developments. Apart from the income smoothed into 1999 our sample reveals little sign of time-series variation with the average discretionary accrual. So our regression results reported later are dominated by cross-sectional variation, which we try to capture graphically in Figure 2. Figure 2 plots accruals across time for firms in the top and bottom third of the discretionary accrual distribution, conditional on the prior year's $\frac{P}{E}$. This shows that the smooth- ing of income into 1999 was general throughout Greek industry, applying to high discretionary accruals companies as a class.

Table 2 and 3 reveals that the sample exhibits strong inter and intra- industry variation in both the size and dispersion of discretionary accruals. Within industrial sectors discretionary accruals, calculated using the Peasnell et al (2000) model, are both positively skewed (apart from in Chemicals) and too dispersed to be captured by the normal distribution. This is important to bear in mind in interpreting the regression based tests presented later because these rely on the assumption of normality in the models' residuals. It also reminds us of the scale of variation in discretionary within our small sample. No doubt this in some part reflects the less controlled accounting environment in Greece, compared to the U.S, where most previous studies of PEAD have been focused[5].

Table 4 gives some estimates of the alternative benchmark model for accruals used to test the hypotheses to be advanced in our study, that is the Jones (1991) model, outlined in equation (2) above. Here non-discretionary total accruals are modelled, as opposed to working capital accruals only. As with the Peasnell, Pope, and Young (2000) estimates of equation (1) the overall performance of the model appears sound. The coefficient values and t-statistics seem comparable to those reported in Jones (1991). Further, the original model was estimated on time-series rather than a cross-section basis by industry. The textiles industry is the sector where the model has least power to predict accruals, as in the case of the Peasnell, Pope, and Young (2000) benchmark. The construction and Miscellaneous sectors do little better, confirming the patchy fit of the Jones (1991) model. So while the Jones (1991) model has a higher explanatory power, on average, we use Peasnell, Pope, and Young (2000) as the primary benchmark in our study because of its ability to explain accrual management in a wider range of industrial settings.

5.2 The profitability of the misvaluation/accruals based trading strategy

Central to the power of the tests we conduct is the selection of the correct earnings announcement date. As mentioned in the data section we relied on the Greek financial press for

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[5] Although evidence for PEAD has also been found elsewhere see Hew, Skerratt, Strong, and Walker (1994) and Liu, Strong, and Xu (2003) for the UK and (Kalunki (1996) and Booth, Kallunki, and Martikainen (1996) for Finland.

these dates, but remain unsure whether the allocation to trading dates is as precise as we would wish. Following Hew, Skerratt, Strong, and Walker (1994) we check for volatility clusters in the data as indicative of new information in the market. We present the results according to our various expected returns benchmarks in Table 5. This confirms the clustering of volatility on the day selected as the ‘‘announcement” dates for our study.

Table 6 reports the profits to a trading strategy based on buying stocks with high discretionary accruals and low $\frac{P}{E}$ and short-selling those with negative accruals and high $\frac{P}{E}$ over a 3 month period i.e. the misvalation/accrual based trading strategy. Figures 3 and 4 plot the CAR's according to our two preferred accruals benchmarks, using the Fama-French abnormal returns benchmark. Note that, as in the case of earnings surprises, it is high accruals-low $\frac{P}{E}$ portfolios where managers are signaling good news about future prospects for the firm, account for the majority of profit to such strategies. This may reflect difficulties, during our sample period, in implementing strategies based on short-selling in the Athens market. The subsequent removal of these short-selling restrictions may allow negative information to be more swiftly impounded into the price of Greek stocks. Nevertheless drift in response to extreme accruals outcomes, in presence of mis-valuation, seems both consistent and both economically and statistically for our sample, even though it takes some time to get underway. The returns from the mis-valuation/accruals based trading strategy take a month to reach statistical significance, but remains available for a further month, leavings investors a long period in which to exploit the anomaly.

We construct our extreme portfolios by dividing our sample companies into three groups, rather than the decile groups which are common in well known US studies of PEAD. This is because of the far smaller sample of observations available to us to undertake this research. While the classic Bernard and Thomas (1990) study employs over 84,000 company/quarter observations we use only between 394 and 435 company/year observations. Hence the precision of the estimates is reduced both by a small sample and the use of less extreme groupings in examining the impact of good or bad news, or high or low discretionary accruals, on post-earnings-announcement returns. Yet our smaller sample must be viewed as reflecting the far smaller number of companies traded on the Athens stock exchange compared to its U.S. counterpart.

Extreme accrual firms may, of course exhibit proportionally greater drift simply because they give investor's greater earnings surprises. So our results presented above may simply be one artifact of a more traditional PEAD story in terms of earnings surprises. In order to ensure this is not the case we embed our PEAD as a selective event hypothesis within a test framework which allows PEAD to occur in response to both extreme accruals and earnings surprises.

We compare the results to a mis-valuation/accrual based strategy to a more normal "earnings surprise" based trading strategy in Table 7. This Table presents the CAR's to a traditional "earnings surprise" based trading strategy, calculated using the Fama-French benchmark. Here cumulative returns result from buying stocks announcing good news about earnings (reporting actual earnings in excess of the last forecast), funding the purchase by selling stocks reporting bad news about earnings. The drift in response to earning surprise is perverse and increasingly so over the 3 month window, suggesting good news firms decline in the market relative to the bad news firms, however the dispersion within good and bad news groups is so great that the observed drift almost never reaches significance.

Comparing the Fama-French CAR's based on a mis-valuation accrual based trading strategy presented in Table 6 (and Figures 3 and 4) and that to a standard earnings surprise strategy in Table 7 it is clear the latter strategy offers a lower (and negative) return. The misvaluation/accrual based trading strategy clearly dominates the traditional earning-surprise strategy in explaining PEAD for our data set. The perverse returns to a standard earnings surprise based strategy in the Greek market means testing the difference between mis-valuation /accrual based trading strategy and a zero return is a more stringent test than a direct comparison of the two strategies. For this reason no direct comparison between the returns to the two alternative strategies is presented here. The return to a misvaluation based trading strategy is clearly both economically and statistically significant, although it takes some time to emerge in the marketplace.

5.3 Regression based tests of the relative value of earnings surprise and misvaluation/accrual based trading strategy

5.3.1 Data descriptives for data entering the regression based tests

In the next section we proceed to some regression based tests of our various hypotheses. But before doing so we consider some summary statistics concerning the various variables entering those regressions. Recall that we use two alternative benchmarks of both ”earnings surprise” and abnormal stock market returns in Table 8. For earnings surprise we consider both a random-walk benchmark, $E_t - E_{t-1}$ and a benchmark based on the deviation of company earnings from the most recent forecast those earnings. Abnormal stock market returns are modelled by the two methods described in equation (4), market-adjusted returns and deviations from the Fama-French three factor benchmark. Table 8 is divided into four panels each of which considers a separate variable. Panel A of Table 8 reports some characteristics of the price-earnings ratio of Greek stocks in our sample. Price-Earnings ratios are both extremely high, very volatile and right-hand-skewed. Prices of Greek stocks in this period were way in excess of fundamentals and consequently stock markets gyrated wildly around true value. The distribution of $\frac{P}{E}$ ratios is important to the allocation of our sample stocks to buy and sell portfolios. The very high average level of $\frac{P}{E}$ ratios in our sample implies overvaluation may of been perceived to be a pretty common phenomenon by company management in our sample companies.

Turning to Panel B of Table 8 the large size and substantial volatility of earnings surprises is clear. Recall the left-hand-skew of the earnings-surprise data series reflected the presence of a small number of very optimistic forecasts, because our forecast error metric is $(Et - Ft-1)$, which is negative for optimistic forecasts. Panel C of Table 8 reports summary statistics for discretionary accruals using the Peasnell, Pope, and Young (2000) benchmark. Discretionary accruals run at a high level, constituting on average between two or three percent of lagged total assets depending on the benchmark used. Finally Panel D of Table 8 presents summary statistics for cumulative abnormal returns in the post-earnings-announcement period. Unsurprisingly given the predominance of optimistic forecasts stock prices on average decline following an earning announcement in our sample. But the presence of a few stocks experiencing large stock price rises following their earning- announcement skews the returns to the right. This skew together with the non-normality of other variables entering our regression tests reported below makes us hesitant in uncritically accepting regression based test results. All our regressions are estimated using a standard, unbalanced panel, with annual yearly dummies included to control for temporal variation.

5.3.2 Interpretation of the regression based test results

This section reports the results of a set of the regression based tests of the viability of the mis-valuation accrual based trading strategy. We report estimates of the mis-valuation/accrual based trading strategy of the form of equation (3), but we begin in Table 9 by reporting the results for a regression based on a traditional "earnings surprise" based trading strategy, of the form of equation (6), as considered in previous research, for example Bernard and Thomas (1989). As in the case of the portfolio plots considered above we obtain perverse results for standard earnings-surprise based strategies in our Greek sample. This perverse impact of earnings news is most apparent at the ten day window, but still remains, if the Fama-French risk adjustment is used, even after 30 days. It appears Greek companies receiving good news about earnings (i.e. actual earnings exceeds the most recent forecast, $Ejt - Fjt > 0$), produce lower investor returns in the month following the earnings announcement than firms receiving bad news about earnings (i.e. actual earnings falls short of the most recent forecast, $Ejt - Fjt < 0$). Of course, firms with poor earnings expectations (which they exceed) may also be more risky, but the result seems both counter-intuitive and out of line with evidence from the US/UK.

Perhaps the failure to uncover PEAD analogous to that found in previous US and UK studies lies in the sheer scale of disappointment about earnings in this sample. When price-earnings ratios run to an average of about sixty earnings expectations are unlikely to fulfilled, if investor's bear in mind earnings as a value relevant metric at all. If earnings expectations become unsustainable for the majority of companies even the "good news" portfolio (i.e. those in the top third of the distribution of earnings-surprises) contains bad news about earnings, although not as bad as the "bad news" portfolio.

Turning to our mis-valuation/accrual based trading strategy. Tables 10 and 11 report the regression results of the validity the mis-valuation/accrual based trading strategy using an equation of the general form of equation (3). Recall that it is in the nature of all accruals, whether discretionary or not, to be self-reversing. So might expect firms reporting extreme accruals outcomes to experience little change in price because investors perceive this element of earnings to be inherently transitory in nature. Our regression results suggest, quite conversely, that investors recognise the selection of earnings, in response to perceived mis-pricing. In the first month of trading following the earnings-announcement there is no support for the recognition by investors of the selection of earnings by company managers. But by thirty days following the earnings announcement there is clear evidence using both discretionary accruals benchmarks and both the abnormal returns benchmarks that the market recognises manager's selection of announced earnings and responds to that choice.

As in the portfolio based tests of the previous section the perversity of the results of the traditional earnings surprise based trading strategy makes it an unattractive benchmark against which to compare the efficacy of our proposed mis-valuation/accrual based trading strategy. Yet it remains possible that the mis-valuation/accrual based trading strategy proxies some part of investor's surprise about earnings not captured by the earning-surprise measure we use here. So in a final test we combine earnings surprises and discretionary accruals in response to past mis-pricing in a single regression of the form of equation (7) above. We present the results in Table 12. The perversity of the response of the Greek stock market to news about earnings is confirmed, while the robustness of mis-valuation/accrual based trading strategy is confirmed. By ten days after the earnings announcement the benefit of buying stocks with high accruals, conditional on a low prior $\frac{P}{E}$, funding the purchase by sales of low discretionary accruals, conditional on a high prior $\frac{P}{E}$, is clear. While the results presented in Table 12 are produced using the Peasnell, Pope, and Young (2000) benchmark a qualitatively similar set of results can be produced using the Jones (1991) benchmark.

6 Conclusions

This paper presents evidence regarding the source and magnitude of PEAD in one of the smaller European exchanges, Athens, during a period of high market volatility. In a sense we seek evidence of the market's inability to predict earnings where it is most likely to be found. We do not find evidence to support the profitability of PEAD based trading strategies in the Greek market. Naive investor's underreaction to earnings cannot be exploited by sophisticated investors in the Greek stock market for profit. However we also report evidence to suggest that the source of under-reaction to earnings is to be found in the smoothing of income into, or out of, the current period by company management. We present evidence that accruals choices in response to perceived mis-pricing dominate earnings surprises as explanation of observed drift. Indeed the Greek market appears to behave perversely in response to earnings news, marking down good news companies, although neither good nor bad news firms seem to command a significant premium. This may be because the Athenian market is informationally inefficient with respect to earnings announcements, or simply that investors do not find such earnings announcements to be value relevant. We also compare the trading profits available to those relying on information about discretionary accruals and/or earnings surprises. The superior trading performance of trading strategies based on information about discretionary accruals conditional on past mis-pricing is demonstrated. That PEAD should be "chosen" by company management, in response to perceived market mis- pricing of the firm, is an implication of one recent theoretical models of the market's response to earnings information. The more lax accounting environment in Greece might make such choices by managers particularly easy to implement. Whether such behaviour might be observed in more developed markets awaits further research.

7 Appendix on construction benchmarks for accruals and returns

7.1 Accrual benchmarks

In this appendix we give details of how exactly we constructed our mea- sures of non-discretionary working capital accruals in equation (1) and non- discretionary total accruals in equation (2).

Working capital accruals has two principal elements, revenue from credit sales and cash-received from customers. The first element here is proxied by revenue, or total sales. The second is proxied by total sales minus the change in trade debtors. In this we follow the original paper Peasnell, Pope, and Young (2000). Total sales is fairly simply defined. Trade debtors net of bad debts includes customer debts, trade notes receivable and accounts receivable with a delay, trade account receivables and, finally, debtors in court.

In the second benchmark model Jones (1991) we require data concerning gross Plant, property and equipment and change in revenues.

7.2 Returns benchmarks

We estimate two abnormal return benchmarks, the market-adjusted model and the Fama-French three-factor model, currently popular in Finance lit- erature (Fama and French (1996)). Both models are estimated on a daily basis, with parameters for the Fama-French model, $\hat{\beta}$, $\hat{\delta}$, $\hat{\gamma}$.

$$AR_{jt}^{MA} = R_{jt} - R_{mt}$$

$$AR_{jt}^{FF} = R_{jt} - [\hat{\alpha} + \hat{\beta} R_{mt} + \hat{\gamma} SMB_t + \hat{\delta} HML_t] \quad (8)$$

The market index we choose for both the market-model and the Fama-French three factor model is the ASE value weighted index. Following Liu, Strong, and Xu (2003), SMB_t is a factor mimicking portfolio for size (as proxied by market value) and HML_t is a factor mimicking portfolio for book to market value. The two factor mimicking portfolios are constructed as follows. Sample stocks are allocated semi- annually to one of two groups, small (s) or big (b), depending on whether they lie above or below the population median market-value in the month the sort was undertaken. Sample stocks are allocated in an independent sort to one of three book-to-market groups, low (l), medium (m), or high (d), depending upon which third of the book-to-market sort they stand. We use breakpoints of the bottom 30% of the book-to-market distribution, the middle 40%, and finally the top 30% of the distribution. Hence size/market-to-book portfolios are constructed, based on the intersection of two size-based portfolios and three, independently derived book-to market sorts. This gives 6 portfolio combinations (s/l, s/m, s/b, b/l, b/m, b/h). The value-weighted monthly returns on the six size book-to-market are calculated for the subsequent six months based on each semi-annual sorting. SMB_t is the difference on each day between the average return on stocks with market values above and be- low the population median at the start of the ranking period. HML_t is the difference in the return each day on two portfolios one of high market-to-book stocks and the other low market-to-book stocks.

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8 Tables

Industry group	λ_0	λ_0(t)	λ_1	λ_1(t)	λ_2	λ_2(t)	F-test	N
Construction	-502744.43	-0.51	1.19	3.97	-1.10	-3.53	6.30	209
Textiles	268969.62	0.72	-0.28	-0.62	0.46	0.96	0.80	126
Metals	741879.35	0.69	0.63	4.66	-0.58	-3.83	28.01	141
Food	877544.06	0.66	0.36	1.12	-0.44	-1.34	2.10	126
Miscellaneous	2102652.85	1.66	-0.05	-0.12	0.00	0.00	0.64	144
Chemicals	-2641365.16	-2.09	0.33	1.39	-0.27	-1.06	1.99	61
Small Cap	43974.29	0.10	0.20	2.36	-0.11	-1.32	15.48	269
Mean	127272.94	0.18	0.34	1.82	-0.29	-1.45	7.90	
Median	268969.62	0.66	0.33	1.39	-0.27	-1.32	2.10	

Table 1: *Estimates of Peasnell et al, (2000), model*

$$\frac{NWCA_t}{TA_{t-1}} = \lambda 0 \left(\frac{1}{TA_{t-1}}\right) + \lambda 1 \frac{REV_t}{TA_{t-1}} + \lambda 2 \frac{CRC_t}{TA_{t-1}} + \varepsilon_t$$

N.B. Here we use revenue minus the change in trade debtors to construct the proxy for cash received from Customers. Each coefficient is followed in the next column by its t-value . So λ_1(t) is the t-value for λ_1, etc.

Industry group	1994	1995	1996	1997	1998	1999	2000	N
Construction	0.05	-0.03	-0.09	-0.01	-0.05	0.31	-0.16	209
Textiles	-0.14	-0.16	-0.32	-0.18	0.06	0.42	0.14	126
Metals	-0.09	-0.06	-0.01	-0.06	-0.03	0.11	-0.08	141
Food	0.08	0.08	0.10	0.27	-0.09	0.08	0.04	126
Miscellaneous	0.02	0.11	-0.18	-0.13	-0.13	0.76	-0.12	144
Chemicals	-0.06	-0.06	0.01	0.07	0.13	-0.18	-0.07	61
Small Cap	-0.11	-0.10	-0.09	-0.10	-0.01	0.17	-0.12	269
Mean	-0.03	-0.03	-0.08	-0.02	-0.02	0.24	-0.05	
Median	-0.06	-0.06	-0.09	-0.06	-0.03	0.17	-0.08	

Table 2: Yearly averages for discretionary working capital accruals from Peasnell *et al* 2000 model

Industry group	Mean	Median	Max	Min	SD	Skew	Kurt	N
Construction	0.00	-0.03	6.02	-1.12	0.54	7.46	79.49	209
Textiles	-0.03	-0.13	10.89	-1.58	1.11	8.37	78.49	126
Metals	-0.03	-0.05	1.71	-0.94	0.26	2.92	18.34	141
Food	0.08	0.06	2.87	-2.44	0.45	1.27	21.54	126
Miscellaneous	0.06	-0.02	14.80	-1.27	1.28	10.73	123.46	144
Chemicals	-0.02	0.01	0.32	-2.18	0.33	-4.71	30.45	61
Small Cap	-0.04	-0.07	3.61	-1.22	0.46	3.99	26.83	269

Table 3: *Summary statistics for discretionary accruals from Peasnell et al (2000) regression by industry*

N.B. Here we use revenue minus the change in trade debtors to construct the proxy for cash received from customers.

Industry group	α_1	α_1(t)	α_2	α_2(t)	α_3	α_3(t)	F-test	N
Construction	-945092.32	-0.92	0.26	2.49	0.11	1.28	3.12	209
Textiles	653961.83	1.61	0.30	1.73	-0.02	-0.15	1.13	126
Metals	1633879.90	1.62	0.18	7.52	-0.05	-1.48	29.15	141
Food	-195937.93	-0.16	-0.29	-6.75	0.04	0.52	15.17	126
Miscellaneous	699285.41	0.54	-0.16	-0.84	0.54	2.02	1.98	144
Chemicals	-2825842.67	-2.40	0.10	0.83	0.03	0.45	1.26	61
Small Cap	1185754.87	2.57	0.28	7.31	-0.20	-4.55	20.61	269
Mean	29429.87	0.41	0.09	1.76	0.06	-0.27	10.35	
Median	653961.83	0.54	0.18	1.73	0.03	0.45	3.12	

Table 4: Estimates of original Jones benchmark discretionary accruals model for 7 sample industries

$$\frac{NDA_t}{TA_{t-1}} = \alpha_1 \left(\frac{1}{TA_{t-1}} \right) + \alpha_2 \frac{\Delta REV_\tau}{TA_{t-1}} + \alpha_3 \frac{PPE_\tau}{TA_{t-1}} + \varepsilon_t$$

NB. Each coefficient is followed in the next Column by its t-value. So α_1(t) is the t-value for α_1, etc.

Obs	σ(-3)	σ(-2)	σ (-1)	σ (0)	σ (+1)	σ (+2)	σ (+3)	Model of Abnormal returns & Expected Earnings
464	0.031	0.030	0.031	**0.033**	0.031	0.030	0.031	$R_j - R_m, E_t - F_{t-1}$
405	0.028	0.029	0.027	**0.031**	0.029	0.028	0.030	Fama, $E_t - F_{t-1}$
493	0.032	0.030	0.031	**0.033**	0.031	0.030	0.032	$R_j - R_m, E_t - F_{t-1}$
429	0.027	0.028	0.027	**0.030**	0.028	0.028	0.029	Fama, $E_t - F_{t-1}$
410	0.030	0.029	0.030	**0.033**	0.031	0.030	0.030	$R_j - R_m, E_t - F_{t-1}$
394	0.028	0.029	0.028	**0.031**	0.029	0.028	0.030	Fama, $E_t - F_{t-1}$
435	0.031	0.029	0.031	**0.034**	0.031	0.031	0.032	$R_j - R_m, E_t - F_{t-1}$
418	0.027	0.028	0.027	**0.030**	0.028	0.028	0.029	Fama, $E_t - F_{t-1}$

Table 5: Volatility of Abnormal Returns Around Earnings Announcements

N.B. σ(-3) is standard deviation of average abnormal returns three days before the earnings announcement, day 0. Each row gives analogous calculations for a different abnormal return/ earnings surprise benchmark. The two abnormal returns benchmarks are market-adjusted returns and Fama-French abnormal returns. The two earnings surprise benchmarks are a random-walk/no-change benchmark, $E_t - E_{t-1}$ and the difference between the actual reported earnings and the most recently issued forecast, $E_t - F_{t-1}$.

	CAR Window						
	(0, +3)	(0, +10)	(0, +20)	(0, +30)	(0, +40)	(0, +50)	(0, +60)
Mean for high discretionary accruals & Low $\frac{P}{E}$	-0.001	0.010	0.027	0.044	0.051	0.068	0.078
Mean for low discretionary accruals & High $\frac{P}{E}$	0.001	-0.017	-0.040	-0.043	-0.057	-0.023	-0.010
Difference in portfolio returns	-0.003	0.028	0.067	0.087	0.108	0.091	0.088
Pooled Variance	0.005	0.010	0.021	0.027	0.041	0.051	0.059
Degree of Freedom	76	76	76	76	76	76	76
t Stat	**-0.177**	**1.193**	**2.041**	**2.331**	**2.340**	**1.771**	**1.602**
P(T <= t) one-tail	0.430	0.118	0.022	0.011	0.011	0.040	0.057
t Critical two-tail	1.992	1.992	1.992	1.992	1.992	1.992	1.992

Table 6: T-Test for differences in cumulative portfolio returns for high discretionary accruals and low P/E versus low discretionary accruals and P/E portfolios.

N.B Abnormal returns here are calculated using the Fama-French benchmark model

$$AR_{jt}^{FF} = R_{jt} - [\hat{\alpha} + \hat{\beta} RM_t + \hat{\delta} HML_t + \hat{\gamma} SMB_t]$$

SMB_t is the difference on each day between the average return on stocks with market values above and below the median at the start of the ranking period. HML_t is the difference in the return each day on two portfolios one of high market-to-book stocks and the other low market-to-book stocks. Finally, discretionary accruals are derived from Peasnell, Pope, and Young (2000) model

$$\frac{NWCA_t}{TA_{t-1}} = \lambda_0 \left(\frac{1}{TA_{t-1}}\right) + \lambda_1 \frac{REV_t}{TA_{t-1}} + \lambda_2 \frac{CRC_t}{TA_{t-1}} + \varepsilon_t$$

where REV is revenue from credit sales and CRC is cash received from customer

Variable	CAR Window						
	(0,+3)	(0,+10)	(0,+20)	(0,+30)	(0,+40)	(0,+50)	(0,+60)
Mean CAR for Good News ($E_t - F_{t-1} > 0$)	0.011	-0.0002	-0.0165	-0.0151	-0.0187	0.0016	0.0186
Mean CAR for Bad News ($E_t - F_{t-1} < 0$)	0.007	0.0069	-0.0109	0.0024	-0.0062	0.0145	0.0334
Difference in CAR for Good and Bad	0.003	-0.0072	-0.0056	-0.0174	-0.0125	-0.0128	-0.0148
Observations	131	131	131	131	131	131	131
Pooled Variance	.0044	0.0200	0.0176	0.0253	0.0430	0.0506	0.061
Degrees of Freedom	260	260	260	260	260	260	260
t Stat	**1.351**	**0.8323**	**0.1120**	**-0.5088**	**-0.1984**	**-0.1944**	**-0.2399**
P(T <= t) one-tail	0.088	0.2030	0.4554	0.3057	0.4215	0.4230	0.4053
t Critical one-tail	1.651	1.6507	1.6507	1.6507	1.6507	1.6507	1.6507
P(T <= t) two-tail	0.177	0.4060	0.9109	0.6113	0.8429	0.8460	0.8106
t Critical two-tail	1.9691	1.9691	1.9691	1.9691	1.9691	1.9691	1.9691

Table 7: T-Test for difference in earnings news portfolios assuming equal variances.

N.B. Abnormal returns here are calculated using the Fama-French benchmark model

Panel A: Summary statistics for total sample $\frac{P}{E}$ ratio

Model of CAR and Expected Earnings used	Mean	Median	Max	Min	SD	Skew	Kurt	N
$Ri - Rm, E_t - F_{t-1}$	57.65	15.63	8602.40	-1136.00	465.83	16.18	285.92	41
$Fama, E_t - F_{t-1}$	58.91	15.70	8602.40	-1136.00	475.13	15.86	274.82	39
$Ri - Rm, E_t - E_{t-1}$	674.59	16.89	235972.43	-1136.00	11403.89	20.37	420.50	43
$Fama, E_t - E_{t-1}$	699.03	16.95	235972.43	-1136.00	11633.30	19.97	404.07	41

Panel B: Summary statistics for total sample SUEs

Model of CAR and Expected Earnings used	Mean	Median	Max	Min	SD	Skew	Kurt	N
$Ri - R_m, E_t - F_{t-1}$	-0.41	0.00	3.94	-12.89	1.61	-3.27	16.87	41
$Fama, E_t - F_{t-1}$	-0.39	0.00	3.94	-12.89	1.56	-3.18	16.95	39
$R_i - R_m, E_t - E_{t-1}$	-0.18	0.00	3.07	-3.62	1.32	-0.49	0.18	43
Fama, $E_t - E_{t-1}$	-0.17	0.01	3.07	-3.62	1.33	-0.48	0.16	41

Table 8: Summary statistics for key variables of interest

N.B. Each row gives analogous calculations for a different abnormal return/earnings surprise benchmark. The two abnormal returns benchmarks are market-adjusted returns and Fama-French abnormal returns. The two earnings surprise benchmarks are a random-walk/no-change benchmark, E_t-E_{t-1} and the difference between the actual reported earnings and the most recently issued forecast, E_t -F_{t-1}.

Panel C: Summary statistics for total sample Discretionary accruals, calculated from Peasnell Pope & Young (2000) model

Model of CAR and Expected Earnings used	Mean	Median	Max	Min	SD	Skew	Kurt	N
$R_i - R_m, E_t - F_{t-1}$	-0.03	-0.04	2.83	-2.44	0.28	1.25	39.36	410
Fama, $E_t - F_{t-1}$	-0.03	-0.04	2.83	-2.44	0.28	1.22	41.67	394
$R_i - R_m, E_t - E_{t-1}$	-0.02	-0.04	6.02	-2.44	0.40	8.11	123.51	435
Fama, $E_t - E_{t-1}$	-0.02	-0.04	6.02	-2.44	0.41	8.22	124.74	418

Panel D: Summary statistics for Fama-French Cumulative Abnormal returns (CAR)

Model of CAR and Expected Earnings used	Mean	Median	Max	Min	SD	Skew	Kurt	N
$R_i - R_m, E_t - F_{t-1}$	-0.07	-0.06	0.85	-0.92	0.25	0.40	1.53	410
Fama, $E_t - F_{t-1}$	-0.01	-0.01	0.98	-0.78	0.24	0.21	1.66	394
$R_i - R_m, E_t - E_{t-1}$	-0.08	-0.08	0.91	-0.92	0.27	0.38	1.47	435
Fama, $E_t - E_{t-1}$	-0.02	-0.02	0.98	-0.83	0.25	0.12	1.46	418

Table 8 (continued): Summary statistics for key variables of interest

N.B. Each row gives analogous calculations for a different abnormal return/earnings surprise benchmark. The two abnormal returns benchmarks are market-adjusted returns and Fama-French abnormal returns. The two earnings surprise benchmarks are a random-walk/no-change benchmark, E_t-E_{t-1} and the difference between the actual reported earnings and the most recently issued forecast, E_t - F_{t-1}

Panel A

Window	α	β_{BAD}	β	B_{GOOD}	R^2	F-test	N
	Using Fama-French abnormal returns benchmarks						
(0,+3)	0.005		0.004		0.001	3.77*	394
	(1.55)		(1.81)				
	0.003	-0.006	0.007	0.005			
	(0.007)	(-0.83)	(1.12)	(0.50)	0.016	2.2	394
	Using Market-adjusted abnormal returns benchmarks						
	0.006				0.002	1.12	410
	(1.81)						
	0.003	-0.007	0.004	0.014	0.023	0.006	410
	(1.03)	(-1.00)	(0.64)	(1.43)			
	Using Fama-French abnormal returns benchmarks						
(0,+10)	-0.002		0.0006		0	0.02	394
	(-0.34)		(-0.13)				
	0.002	-0.012	0.015	-0.031	0.015	2	394
	(0.46)	(-1.45)	(2.04)	(-2.36)			
	Using Market-adjusted abnormal returns benchmarks						
	-0.009		0.009		0.012	4.99*	410
	(-1.64)		(1.77)				
	-0.007	-0.036	0.04	-0.039	0.04	5.68*	410
	(-1.36)	(-2.89)	(3.55)	(-1.97)			

Table 9: Regressions of observed PEAD on earnings surprise: testing viability of traditional PEAD strategy in the Greek market

$$CAR_{it} = \alpha + \beta_{BAD}.BAD.SURP_{jt} + \beta.SURPR_{jt} + \beta_{GOOD}.GOOD.SURP_{jt}$$

$$Where\ SURP = \frac{E_{jt}-F_{jt}}{\sigma_E}$$

here β_{GOOD} captures the stock market response to earnings in excess of the most recent forecast and β_{BAD} captures the stock market response to earnings below the most recent forecast. E_{jt} actual earnings of firm j in year t and F_{jt} is forecasted earnings of firm j in year t, $\sigma_E$is the time-series standard deviation of earnings for the relevant firm in the years 1992-2000. * denotes significance at the 95 % confidence interval.

Panel B

Using Fama-French abnormal returns benchmarks

Window	α	β_{BAD}	β	β_{GOOD}	R^2	F-test	N
(0,+30)	-0.009		0.004		0	0.34	394
	(-1.08)		(0.59)				
	-0.004	-0.023	0.027	-0.044	0.012	1.62	394
	(-0.46)	(-1.89)	(2.71)	(-2.33)			
	Using Market-adjusted abnormal returns benchmarks						
	-0.05		0.004		0	0.32	410
	(-5.29)		(0.58)				
	-0.049	-0.032	0.03	-0.031	0.009	1.197	410
	(-5.01)	(-2.2)	(2.32)	(-1.18)			

Table 9 (continued): Regressions of observed PEAD on earnings surprise: testing viability of traditional PEAD strategy in the Greek market

$$CAR_{it} = \alpha + \beta_{BAD}.BAD.SURP_{jt} + \beta.SURPR_{jt} + \beta_{GOOD}.GOOD.SURP_{jt}$$

$$Where\ SURP = \frac{E_{jt} - F_{jt}}{\sigma_E}$$

where BAD is a dummy set equal to one where the earnings surprise is in the most pessimistic third of all observations that year and zero otherwise, GOOD is a dummy set equal to one where the earnings surprise is in the most optimistic third of all observations that year and zero otherwise, β_{GOOD} captures the stock market response to earnings in excess of the most recent forecast and β_{BAD} captures the stock market response to earnings below the most recent forecast.

Our chosen proxy for the "earnings surprise" used in traditional studies of PEAD is the difference between the most recent forecast issued by an analyst for a particular stock and the announced earnings-per-share.

Panel A

Window	α	γ_{LOW}	γ	γ_{HIGH}	R^2	F-test	N
	Using Fama-French abnormal returns benchmarks						
(0,+3)	0.004		0.01		0.001	0.48	394
	(1.23)		(0.67)				
	0.004	0.004	0.013	-0.024	0.002	0.27	394
	(1.35)	(0.09)	(0.7)	(-0.8)			
	Using Market-adjusted abnormal returns benchmarks						
	0.006		0.007		0	0.19	410
	(1.71)		(0.47)				
	0.006	-0.01	0.013	-0.032	0.002	0.21	410
	(1.73)	(-0.18)	(0.78)	(-0.92)			
	Using Fama-French abnormal returns benchmarks						
(0,+10)	-0.002		0.006		0	0.06	394
	(-0.37)		(0.22)				
	-0.001	0.094	-0.013	0.034	0.005	0.71	394
	(-0.19)	(1.08)	(-0.37)	(0.54)			
	Using Market-adjusted abnormal returns benchmarks						
	-0.012		0.005		0	0.03	410
	(-2.28)		(0.17)				
	-0.01	0.0137	-0.016	0.013	0.008	1.16	410
	(-1.72)	(1.43)	(-0.46)	(0.21)			

Table 10: Regressions of observed PEAD on discretionary accruals from the Peasnell *et al* (2000): testing viability of the accruals based strategy in the Greek market

$$CAR_{jt} = \alpha+\gamma_{LOW}LOW.DA-PPY_{jt}+\gamma.DAPPY_{jt} +\gamma_{HIGH}.HIGH.DA-PPY_{jt}+\varepsilon_{jt}$$

where DA-PPY is ε_t from equation (1) repeated below

$$\frac{NWCA_t}{TA_{t-1}} = \lambda_0 \left(\frac{1}{TA_{t-1}}\right) + \lambda_1 \frac{REV_t}{TA_{t-1}} + \lambda_2 \frac{CRC_t}{TA_{t-1}} + \varepsilon_t$$

* denotes significance at the % 95 confidence interval.

Panel B

Using Fama-French abnormal returns benchmarks

Window	α	γ_{LOW}	γ	γ_{HIGH}	R^2	F-test	N
(0,+30)	-0.011		-0.013		0	0.12	394
	(-1.33)		(-0.31)				
	-0.014	0.173	-0.085	0.294	0.02	2.74	394
	(-1.69)	(1.59)	(-1.64)	(2.89)			
	Using Market-adjusted abnormal returns benchmarks						
	-0.05		0.046		0.003	1.23	410
	(-5.67)		(1.09)				
	-0.052	0.107	0.001	0.2	0.01	1.41	410
	(-5.48)	(0.77)	(0.02)	(2.04)			

Table 10 (continued): Regressions of observed PEAD on discretionary accruals from the Peasnell et al (2000): testing viability of the accruals based strategy in the Greek market

$$CAR_{jt} = \alpha+\gamma_{LOW}LOW.DA-PPY_{jt}+\gamma.DA_{P}PY_{jt}+\gamma_{HIGH}.HIGH.DA-PPY_{jt}+\varepsilon_{jt}$$

where DA-PPY is ε_t from equation (1) repeated below

$$\frac{NWCA_t}{TA_{t-1}} = \lambda_0\left(\frac{1}{TA_{t-1}}\right) + \lambda_1\frac{REV_t}{TA_{t-1}} + \lambda_2\frac{CRC_t}{TA_{t-1}} + \varepsilon_t$$

* denotes significance at the % 95 confidence interval.

Panel A

Window	α	γ_{LOW}	γ	γ_{HIGH}	R^2	F-test	N
	Using Fama-French abnormal returns benchmarks						
(0,+3)	0.003		0.007		0	0.02	394
	(1.61)		(0.52)				
	0.005	0.033	0.011	-0.044	0.005	0.61	394
	(1.67)	(0.71)	(0.66)	(-1.24)			
	Using Market-adjusted abnormal returns benchmarks						
	0.005		-0.002		0	0.02	410
	(1.24)		(-0.14)				
	0.006	0.014	0.001	-0.029	0.001	0.15	410
	(1.77)	(0.24)	(0.06)	(-0.70)			
	Using Fama-French abnormal returns benchmarks						
(0,+10)	0		0.032		0.005	2.08	394
	(-0.08)		(1.38)				
	0.001	0.054	0.031	-0.015	0.006	0.86	394
	(0.14)	(0.66)	(1.12)	(-0.23)			
	Using Market-adjusted abnormal returns benchmarks						
	-0.011		0.024		0.002	1	410
	(-2.08)		(0.98)				
	-0.009	0.141	0.016	-0.016	0.009	1.22	410
	(-1.46)	(1.35)	(0.60)	(-0.24)			

Table 11: Regression of observed PEAD on discretionary accruals from the Jones (1991): testing the viability of the accruals based trading strategy in the Greek market

Where the Jones (1991) benchmark model is as follows

$$\frac{NDA_t}{TA_{t-1}} = \alpha_1 \left(\frac{1}{TA_{t-1}} \right) + \alpha_2 \frac{\Delta REV_\tau}{TA_{t-1}} + \alpha_3 \frac{PPE_\tau}{TA_{t-1}} + \varepsilon_t$$

where NDA denotes non-discretionary accruals, A_{t-1} lagged total assets, ΔREV, changes in total revenue, PPE, gross plant property and equipment and, finally, ε_t, the error in equation (2) proxies for discretionary accruals.

Panel B

Window	α	γ_{LOW}	γ	γ_{HIGH}	R^2	F-test	N
	Using Fama-French abnormal returns benchmarks						
(0,+30)	-0.01		0		0	0	394
	(-1.27)		(0)				
	-0.014	0.227	-0.053	0.261	0.02	2.6	394
	(-1.53)	(2.45)	(-1.28)	(3.18)			
	Using Market-adjusted abnormal returns benchmarks						
	-0.05		0.029		0.001	0.61	410
	(-5.68)		(0.81)				
	-0.05	0.24	-0.003	0.123	0.11	1.48	410
	(-5.04)	(1.57)	(-0.08)	(1.38)			

Table 11 (continued): Regression of observed PEAD on discretionary accruals from the Jones (1991): testing the viability of the accruals based trading strategy in the Greek market

$$CAR_{jt} = \alpha + \gamma_{LOW} LOW.DA-J_{jt} + \gamma . DA-J_{jt} + \gamma_{HIGH} . HIGH.DA-J_{jt} + \varepsilon_{jt}$$

where DA-J is ε_t from equation (2) repeated below

$$\frac{NDA_t}{TA_{t-1}} = \alpha_1 \left(\frac{1}{TA_{t-1}} \right) + \alpha_2 \frac{\Delta REV_\tau}{TA_{t-1}} + \alpha_3 \frac{PPE_\tau}{TA_{t-1}} + \varepsilon_t$$

* denotes significance at the % 95 confidence interval.

Window	α	γ_{LOW}	γ	γ_{HIGH}	β_{BAD}	β	β_{GOOD}	R^2	F-test	N
	Using Fama-French abnormal returns benchmarks									
(0,+3)	0.004	0.012	0.012	-0.014	-0.006	0.007	0.005	0.02	1.25	394
	(1.23)	(0.25)	(0.67)	(-0.48)	(-0.86)	(1.13)				
	Using Market-adjusted abnormal returns benchmarks									
	0.003	0.011	0.011	-0.015	-0.006	0.004	-0.015	0.024	1.66	394
	(0.89)	(0.19)	(0.61)	(-0.46)	(-1.011)	(0.65)	(-0.46)			
	Using Fama-French abnormal returns benchmarks									
(0,+10)	0.003	0.081	-0.011	0.013	-0.013	0.015	-0.03	0.02	1.23	394
	(0.53)	(1.01)	(-0.033)	(0.22)	(-1.53)	(2.04)	(-2.31)			
	Using Market-adjusted abnormal returns benchmarks									
	-0.006	0.14	-0.016	0.003	-0.038	0.04	-0.037	0.049	3.46	410
	(-0.94)	(1.46)	(-0.47)	(0.05)	(-2.99)	(3.57)	(-1.98)			
	Using Fama-French abnormal returns benchmarks									
(0,+30)	-0.01	0.165	-0.08	0.27	-0.024	0.026	-0.037	0	0.12	394
	(-1.05)	(1.54)	(-1.64)	(2.69)	(-2.06)	(2.72)	(-1.96)			
	Using Market-adjusted abnormal returns benchmarks									
	-0.051	0.12	-0.002	0.198	-0.031	0.028	-0.024	0.02	1.29	410
	(-4.75)	(0.89	(-0.04)	(2.03)	(-2.2)	(2.23)	(-0.98)			

Table 12: Regressions of observed PEAD on discretionary accruals from the Peasnell *et al* model and earnings surprises. Comparing of the mis-valuation/accruals based trading strategy and a traditional strategy in the Greek market

$$CAR_{jt} = \alpha + \gamma_{LOW}\,.DA - PPY_{jt} + \gamma.DA - PPY_{jt} + \gamma_{HIGH}.DA - PPY_{jt} + \beta_{BAD}.BAD.SURP_{jt}$$
$$+\beta.SURP_{jt} + \beta_{GOOD}.GOOD.SURP + \varepsilon_{jt}$$

where DA-PPY is ε_t from equation (1) repeated below

$$\frac{NWCA_t}{TA_{t-1}} = \lambda_0\left(\frac{1}{TA_{t-1}}\right) + \lambda_1\frac{REV_t}{TA_{t-1}} + \lambda_2\frac{CRC_t}{TA_{t-1}} + \varepsilon_t$$

where BAD is a dummy set equal to one where the earnings surprise is in the most pessimistic third of all observations that year and zero otherwise, GOOD is a dummy set equal to one where the earnings surprise is in the most optimistic third of all observations that year and zero otherwise, SURPjt is the difference between actual earnings and the most recently issued forecast, for each sample firm each year, divided through by the standard deviation of that firm's earnings in the years 1992-2000. The coefficient γ_{HIGH} is a coefficient on those observations taken from company years in the highest third of all observations on discretionary accruals, while ranking in the lowest third of prior P/E ratios. γ_{LOW} is a coefficient on those observations taken from company years in the lowest third of all observations on discretionary accruals, while ranking in the highest third of prior P/E ratios. The coefficient β_{BAD} is a coefficient on those observations taken from company/years in the most pessimistic third of all observations on earnings surprises (recall we define the numerator as actual minus the most recent forecast), β_{GOOD} is a coefficient on those observations taken from company/years in the most optimistic third of all observations on earnings surprise.