IS THERE AN ACCRUALS OR A CASH FLOW ANOMALY IN UK STOCK RETURNS?

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Abstract

In this paper, we apply a modified version of the Mishkin (1983) test to companies in the UK stock market in order to investigate the presence of accruals and cash flow effects on UK firms' annual returns. First, we find that accruals decile rankings have U-shaped, or inverted U-shaped, or no relationships with most of the risk variables. Accruals decile rankings have, however, a negative relationship with the ratio of research and development to market value which is known to have a positive relationship with returns. Second, regarding the relationship between risk controls and returns, we find evidence associated with an RD effect and some evidence in favour of earnings-price and past return effects. We find little evidence of firm size, book to-market, and firm leverage effects, once the other variables are controlled for. Third, for the period 1990-2007, we report little evidence of general accruals mispricing in the UK in which accruals have a negative relationship with future returns, once risk has been accounted for. Additionally, after treatment of extreme observations, evidence of cash flow mispricing is found for the UK stock market. An alternative interpretation of our results is that there is no separate accruals effect, at least in the way predicted by the conventional mispricing stories, once other effects are taken into account, but there is a separate cash flow effect.

1 INTRODUCTION

Since being reported by Sloan (1996), the accruals anomaly in the USA has attracted the attention of researchers trying to better understand it. Simply put, based on a sample of firms listed on the NYSE and AMEX, and a specific application of the Mishkin (1983) test, Sloan (1996) reports that US investors seem unable to correctly understand the persistence of the different components of reported earnings. Put another way, US investors, in the aggregate, are irrational forecasters. In particular, when forecasting next period earnings, such investors over-weight the accruals component, and under-weight the cash flow component, of earnings. Consequently, firms that have relatively high (low) accruals are found to have higher (lower) earnings forecast than is rational. This leads to accruals being negatively associated with returns. It is this irrational forecasting that is thought of as the accruals anomaly.

Sloan (1996) then hypothesises that it could be possible to take advantage of the identified inefficient forecasts and implement an investment strategy that yields abnormal returns. Such a strategy involves going long on low accruals firms and short on high accruals firms, with the original results in Sloan (1996) estimating a size-adjusted, one year-ahead, abnormal return of 10.4%.

Following the initial results by Sloan (1996), researchers have explored various aspects of the accruals anomaly on US data.[1] One particular line of questioning is concerned with how the Mishkin (1983) test is applied in Sloan (1996). The conventional way in

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[1] See Soares and Stark (2009) for a summary of various other lines of questionning explored with respect to the accruals anomaly and its implications.

which the Mishkin (1983) test has been applied in investigating the accruals anomaly is to posit two equations – the first a linear forecasting equation in which earnings are forecast using accruals and cash flows as the forecasting variables, the second an abnormal returns equation in which abnormal returns are solely a function of unexpected earnings. The two equations are simultaneously estimated and inconsistencies between the two tested for.

Kraft *et al*. (2007) raise a number of issues concerning this application of the Mishkin (1983) test in Sloan (1996). First, they point out that the two-stage estimation process requires that the sample of firms used has a potential survivorship bias built into it as a consequence of a requirement for next year's earnings to be available and, hence, that the firm has survived for a further year in order for it to enter into the sample for any given year. Second, but still operating within the two equation structure identified above, they argue that the two-stage version of the Mishkin (1983) test is particularly sensitive to the presence of omitted variables in the earnings forecasting equation that are themselves mis-priced when attempting to draw inferences about specific components of earnings (e.g., accruals and cash flows). Third, they suggest that an alternative version of the Mishkin (1983) test, based upon the form put forward by Abel and Mishkin (1983) involving the estimation of only a single equation in which abnormal returns are expressed as a function of earnings forecasting variables (including accruals and cash flows, but also other variables thought to be useful in forecasting earnings), is equally as appropriate as the two-stage process. Here, the null hypothesis is that the forecasting variables should have no explanatory power if pricing is rational. This approach can deal with the omitted variables problem more easily than the two-stage process, and also does not require that one period-ahead earnings are known for a firm to enter into the estimation sample.

As mentioned above, Kraft *et al*. (2007) still assume that, even in the presence of a number of different earnings forecasting variables, abnormal returns can safely be modelled only as a function of unexpected profits. As a consequence, they still assume that only a single forecasting equation - that for earnings - is relevant for identifying forecasting irrationality and a significant coefficient for any forecasting variable in explaining one period-ahead abnormal returns implies that its true weight in forecasting *earnings* is misunderstood by market participants. The specific form of forecasting irrationality then can be identified.

Pope (2001) provides another line of criticism of the Mishkin (1983) methodology within the two-stage framework, however. He points out that if accruals and cash flows have different forecasting implications for one-year-ahead earnings, modelling abnormal returns as a function of unexpected earnings alone potentially results in a mis-specification problem caused by omitted variables. Specifically, abnormal returns should be modelled as a function of unexpected accruals and unexpected cash flows. This has two implications. First, there ought to be two forecasting equations estimated – one for accruals and one for cash flows. Second, treating unexpected earnings as the only independent variable will result in a correlated omitted variable that could render inferences problematic.[2]

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[2] Francis and Smith (2005) find that firm-specific estimates of the persistence of accruals and cash flows in forecasting next period's income from continuing operations are approximately equal, in contrast to the cross-sectional estimates used in implementing the Mishkin (1983) test in Sloan (1996) and other papers. This suggests that the Mishkin (1983) test could also be flawed in the context of investigating the presence of an accruals anomaly as a consequence of the use of cross-sectional estimates of the income forecasting equation.

With respect to Kraft *et al*. (2007), the basic structure of analysis of Pope (2001) suggests two problems. First, abnormal returns ought to be modelled as a function of all the unexpected components of the earnings forecasting variables. Second, forecasting equations for each of the forecasting variables need to be modelled. The first contribution of the paper is to describe a single-stage Mishkin (1983) test that incorporates these features, together with identifying the inferences that can be drawn from the test. The single-stage test essentially follows the same form as that in Kraft *et al*. (2007). Nonetheless, we observe that although pricing irrationality implies forecasting irrationality, the converse is not true. Further, pricing irrationality does not enable any *specific* form of forecasting irrationality to be identified.

A second form of problem with applying our Mishkin (1983) test is the measurement of abnormal returns. Such a task requires the specification of an asset pricing model or, more generally, a risk control approach (this issue also arises when the profitability of accruals-based trading strategies are investigated). Three approaches seem possible. First, an asset pricing model could be specified, the parameters of which can be estimated from historical data in order to estimate a ‘normal’ return against which the actual return can be benchmarked. Nonetheless, in the UK in particular, it is not clear which asset pricing model is appropriate. For example, Michou *et al*. (2010) suggest that neither the capital asset pricing model nor versions of the Fama-French (1993) three factor model are well-specified on UK data. Further, Gregory *et al*. (2009) question the efficacy of expanding the three factor model to include a momentum factor.[3]

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[3] Khan (2008) questions whether the approaches used to control for risk in assessing the returns to accruals-based portfolio strategies in the US are effective. He provides evidence that the risk models normally used by previous studies might not be complete in correctly capturing risk, with insignificant abnormal returns for accruals-based hedge portfolios being reported when using an

Second, individual firm returns can be matched with the return on a benchmark portfolio formed on the basis of firm characteristics thought to capture risk. Such an approach has been popular in the US, where size-matched abnormal returns have often been estimated in the context of tests of the accruals anomaly. The difficulty with this approach is that, in the UK in particular, it is difficult to match on any more than two risk characteristics, because of the number of listed firms, whereas evidence suggests that there are more than two characteristics with the potential to capture risk (for example, Al-Horani *et al*., 2003, and Dedman *et al*., 2009, suggest that the ratio of research and development expenditures to market value is the single strongest explanatory variable of returns when size, book-to-market, and the ratio are compared and prior research also suggests that returns are related to the earnings-price ratio, past returns, and leverage).

Third, individual firm returns can be regressed on firm characteristics known to be associated with the cross-section of returns (e.g., size, book-to-market, past returns, *etc*.), together with accruals and cash flows (e.g., Pincus *et al*., 2007). Essentially, this moves the expected return component of the dependent variable in the Mishkin (1983) test to the right hand side of the equation.

Such an approach can be interpreted in more than one way, however. If there are rational reasons why the firm characteristics should capture risk, the regression approach allows an expanded approach to capturing risk. Alternatively, if it is not clear why, from a theoretical perspective, the chosen firm characteristics capture risk, the

extended model of asset pricing which includes the Fama and French (1993) factors, and two additional factors (based on dividends on the market portfolio, and news about the future expected returns on the market portfolio).

regression approach has the potential to identify whether one anomaly (e.g., the accruals anomaly) is distinct from other anomalies (e.g., the size anomaly).

Finally, using US data, Kothari *et al*. (2005) find that the Mishkin (1983) test is sensitive to the treatment of extreme observations. For example, Pincus *et al*. (2007) winsorise their data to protect their inferences from the contaminatory effects of extreme observations. Further, Kraft *et al.* (2006) report that only the highest accruals decile is found to be mispriced when excluding a set of extreme observations.

Given that the accruals anomaly is initially argued to be a product of irrationality by investors operating in the US market, it becomes an interesting issue as to whether investors operating in other well-established stock markets suffer from similar irrationalities. After all, it is not clear that, for example, educational and training backgrounds, which might give rise to forms of irrationalities in a particular set of investors, are common to sets of investors operating in different countries and stock markets. As a consequence, it is perhaps surprising that, internationally, the evidence on the accruals anomaly is limited.

According to LaFond (2005), the accruals anomaly is found in several countries and is mainly driven by working capital accruals. Pincus *et al.* (2007) survey twenty countries and report that the accruals anomaly is concentrated in those countries characterized by the extensive use of accruals accounting, widespread share ownership and whose legal system is based on common law. More specifically, the accruals anomaly is only found in the US, UK, Canada and Australia while, in the rest of the countries, no anomaly is detected. However, Leippold and Lohre (2008) raise concerns about the testing procedures used by LaFond (2005) and Pincus *et al.* (2007) when multiple testing is employed. Using a sample of 29 countries for the years of 1994 to 2007, Leippold and Lohre (2008) provide evidence that partial results from previous studies might be driven by errors in data and testing procedures that, once corrected, only detect accruals mis-pricing for the US.

Kaserer and Klinger (2008) report evidence that the accruals anomaly is found for German companies that adopted IFRS early, but no evidence of such an anomaly is found for those firms that kept using German GAAP. Based on a UK sample spanning the years of 1986-2005, Chan *et al*. (2009) provide evidence that changes in the regulatory framework aimed to improving the quality of financial information, lead to a reduction of in the extent of the accruals anomaly of companies with poor accounting quality information. Finally, Soares and Stark (2009) find evidence in the UK of abnormal returns predictability based upon accruals rankings, but a hedge strategy is not profitable when implementable investment strategies and transaction costs are considered.[4] Overall, while some evidence of the accruals anomaly is found in countries other than the US, it is not clear how consistent or robust it is.

In this paper we extend both international evidence, and evidence specifically in the UK, as a well-established stock market, on the accruals anomaly. As a consequence, we focus on the use of Mishkin (1983) tests and the identification of general forecasting irrationalities. We initially develop an adaptation of the Kraft *et al*. (2007) version of the Mishkin (1983) test that takes into account the Pope (2001) critique. This test also allows us to incorporate other information variables that are thought to predict earnings

[4] Pincus *et al*. (2007) also suggest that accruals mispricing is not exploitable in the UK once transactions costs are taken into account. Unlike Soares and Stark (2009), they do not estimate transactions costs directly, however.

(at least in the USA). We then incorporate a greater number of risk controls than used in prior UK work (and elsewhere). Further, we investigate the impact of extreme observations on our analyses. On applying this version of the Mishkin (1983) test, we conclude that there is little evidence of an accruals anomaly, in the sense identified above, whether using raw or winsorised data. Evidence of a cash flow effect is found, with returns generally increasing in cash flow, when winsorised data are used.

We follow up this evidence by extending the regressions outside the framework of the Mishkin (1983) test by first substituting a set of dummy variables capturing the decile rank of the accruals variable for the underlying accruals variable, leaving the other variables unchanged.[5] This allows the relationship between accruals and risk-adjusted returns to be both non-linear and non-monotonic. Second, we substitute a set of dummy variables capturing the decile rank of the cash flow variable for the underlying cash flow variable, again leaving the other variables unchanged. This allows the relationship between cash flows and risk-adjusted returns to be both non-linear and non-monotonic. We find that the relationship between accruals rankings and risk-adjusted returns is generally negative if extreme observations are left unaltered in the dataset. If winsorised data are used, there is little evidence of any accruals anomaly. For cash flows, the results, whilst not being fully monotonic, suggest that there is a general trend for risk-adjusted returns to increase with cash flow rank. This is particularly significant if winsorised data are used.

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[5] It is outside the framework of the Mishkin (1983) test in the sense that there is no explicit forecasting model built into this test. It is within the general spirit of the Mishkin (1983) test, however, because that test disallows the property that past accounting data, or transformations of that data, can predict future abnormal returns.

Overall, there is little evidence for any accruals anomaly in which returns decline as accruals increase, once an extended set of risk controls are taken into account, and the influence of extreme observations is reduced. In fact, there is stronger evidence suggesting that there is a cash flow effect in annual returns. As indicated above, however, an alternative interpretation is that the accruals effect is not a separate effect, once the effects of other variables considered to predict future returns are taken into account, whereas the cash flow effect is separate.

This paper is organized into four subsequent additional sections. Section 2 provides the development of the Mishkin (1983) tests, and details of the regressions estimated. Section 3 presents details of the sample used in the paper, and the empirical definitions of the various variables used in the various analyses. Section 4 reports the empirical results. Section 5 presents the conclusions of the paper.

2 METHODOLOGY

The Mishkin (1983) test was initially developed to test rational market expectations hypotheses in macroeconomics. The idea underlying the test is that, if the market is rational, then it is not possible to obtain abnormal returns from investing in any assets based on past information, since all the relevant past information necessary for their valuation is incorporated in the current price. To test this hypothesis, Mishkin (1983) proposes comparing the relevant pricing factors of a security at time *t* with the rational one-period-ahead forecasts of these variables.

Extending Pope (2001), we posit a system of n+1 equations, one dealing with pricing and n separate forecasting equations. The forecasting variables are accruals, cash flows, and n-2 other posited forecasting variables. The abnormal returns equation is:

$$R_{t+1} - E(R_{t+1}) = \alpha + \beta_1(ACC_{t+1} - E(ACC_{t+1})) + \beta_2(CF_{t+1} - E(CF_{t+1})) + \sum_{i=1}^{n-2}\beta_{i+2}(X_{i,t+1} - E(X_{i,t+1})) + \mu_{t+1} \quad (1)$$

where:

$ACC_{,t+1}$: is the firm's accruals at $t+1$;

$CF_{,t+1}$: is the firm's cash flows at $t+1$;

R_{t+1} : is the return on the firm's stock at $t+1$;

$E(R_{t+1})$: is the expected return on the firm's stock at $t+1$; and

$X_{i,t+1}$: is the value for additional forecasting variable i for the firm at $t+1$.

Equation (1) is just a 'standard' abnormal returns equation, where abnormal returns are expressed as a function of the unexpected components of accounting and other relevant variables. We include accruals and cash flows because the accruals anomaly context allows accruals and cash flows to have separate forecasting ability for earnings (as in Pope, 2001). We include other forecasting variables because prior research in the USA documented in Kraft *et al* (2007) suggests that variables other than accruals and cash flow also have forecasting ability for future earnings.

The n 'true' forecasting equations then are:

$$ACC_{t+1} = a_{1,0} + a_{1,1}ACC_t + a_{1,2}CF_t + \sum_{i=1}^{n-2} a_{1,i+2}X_{i,t} + \varepsilon_{1,t+1},$$

$$CF_{t+1} = a_{2,0} + a_{2,1}ACC_t + a_{2,2}CF_t + \sum_{i=1}^{n-2} a_{2,i+2}X_{i,t} + \varepsilon_{2,t+1},$$

with generic forecasting equations for the other variables, X_i, of:

$$X_{j+2,t+1} = a_{j+2,0} + a_{j+2,1}ACC_t + a_{j+2,2}CF_t + \sum_{i=1}^{n-2} a_{j+2,i+2}X_{i,t} + \varepsilon_{j+2,t+1},\ j = 1,...,n-2$$

Using matrix algebra, the system of n+1 equations can be represented as:

$$R_{t+1} - E(R_{t+1}) = \alpha + \beta'(F_{t+1} - E(F_{t+1})) + \mu \qquad (2)$$

and

$$F_{t+1} = a + A.F_t + \mathrm{E}_{t+1} \qquad (3)$$

where β' is a row vector with characteristic element β_i; F is a column vector containing the forecasting variables *ACC*, *CF*, and X_i, $i = 1, \ldots, n-2$; a is a column vector with characteristic element $a_{j,0}$; $j = 1, \ldots, n$; A is an $n \times n$ matrix with characteristic element $a_{j,k}$, $j, k = 1, \ldots, n$; and E is a column vector with characteristic element ε_j.

With rational forecasting (i.e., the 'market' uses the 'true' forecasting equations in forming expectations). Hence, inserting (2) in (1) gives:

$$R_{t+1} - E(R_{t+1}) = \alpha + \beta'(E_{t+1}) + \mu \qquad (4)$$

Thus, rational forecasting suggests that the expected coefficients of the independent variables of any regression of $R_{t+1} - E(R_{t+1})$ on F_t are zero as long as the elements of E_{t+1} are uncorrelated with the forecasting variables F_t.

If equation (1) is an adequate description of how market prices are set, but the market mis-forecasts F using the matrix M in generating expectations about the forecast variables, then inserting the mis-forecasted variables into equation (1) produces

$$R_{t+1} - E(R_{t+1}) = \alpha + \beta^{'}(A - M)F + \beta'(E_{t+1}) + \mu \qquad (5)$$

Hence, the use of incorrect (irrational) forecasts allows for non-zero coefficients for the independent variables of any regression of $R_{t+1} - E(R_{t+1})$ on F_t as long as:

$$\beta^{'}(A - M) \neq 0 \qquad (6)$$

Nonetheless, in this setting, forecasting irrationality does not imply pricing irrationality because:

$$M \neq A \text{ does not imply } \beta^{'}(A - M) \neq 0$$

It is the case, however, that:

$$\beta^{'}(A - M) \neq 0 \Rightarrow M \neq A$$

Hence, pricing irrationality does imply forecasting irrationality. Nonetheless, because of the complexity of the forecasting equations, an element of $\beta^{'}(A-M)\neq 0$ being, say, negative (e.g., the coefficient of accruals, as in previous research) does not imply specifically how accruals are being used incorrectly to forecast any of the relevant variables.

In this paper, we follow a process similar to that in Kraft *et al*. (2007) and empirically test for pricing irrationality by running the following equation:

$$R_{t+1}=\lambda_0+\sum_{i=1}^{n}\lambda_{1,i}F_{i,t}+\sum_{j=1}^{m}\lambda_{2,j}C_{j,t}+\delta_{t+1} \qquad (7)$$

where:

$C_{j,t}$: are *m* firm characteristics intended to capture risk.

Our tests for pricing irrationality are that $\lambda_{1,i}=0,\forall i=1,...,n$. In equation (7) we essentially shift $E(R_{t+1})$ to the right hand side and, rather than use abnormal return as the dependent variable, we control for risk by adding in independent variables intended to control for risk. As a consequence, we proxy for $E(R_{t+1})$ by $\sum_{j=1}^{m}\lambda_{2,j}C_{j,t}$.

One of the advantages of this form of the Mishkin (1983) test is that its implementation does not require firms to have earnings information in year *t*+1. The two-stage version of the Mishkin (1983) test, in which pricing and forecasting equations are estimated simultaneously, imposes such a data requirement. The two-stage process has the advantage that specific forecasting inefficiencies can be identified, although the estimation process inevitably gets more complex as the number of forecasting variables and equations increases. Nonetheless, as has been observed elsewhere, this requirement introduces a forward-looking bias into sample selection by excluding firms that delist in the year following the beginning of the returns accumulation period.

3 REGRESSIONS, DATA SOURCES, AND VARIABLE DEFINITIONS

Our specific research approach is to first run a restricted version of the regression equation (6) with only the risk control variables included as independent variables. The risk control variables we include are: (i) size (*Size*); (ii) the book-to-market ratio (*BM*); (iii) the ratio of research and development expense to market value (*RD*); (iv) the earnings-to-price ratio (*EP*); (iv) leverage (*Lev*); and (vi) the firm's return in the prior eleven months (*PastRet*). The inclusion of these variables can be justified by the UK evidence reported by Strong and Xu (1997), Liu *et al*. (1999), Gregory *et al*. (2001), Al-Horani *et al*. (2003), Fama and French (1998), and Dedman *et al*. (2009). Then, we add in the accruals and cash flow variables (*ACC* and *CF*). Finally, we add in a set of additional forecasting variables as in Kraft *et al*. (2007): (i) sales (*SALES*); (ii) sales growth (*SG*): (iii) capital expenditures (*Capex*); and (iv) the growth in capital expenditures *(CapexG*).

Therefore, the first set of equations estimated are as follows. We first estimate:

$$RET_{i,t+1} = \beta_0 + \beta_1 Size_{i,t} + \beta_2 BM_{i,t} + \beta_3 RD_{i,t} + \beta_4 EP_{i,t} + \beta_5 PastRet + \beta_{6m} Lev + \mu'_{i,t} \quad (8)$$

Then, we estimate:

$$\begin{aligned} RET_{i,t+1} = {} & \beta_0 + \beta_1 Size_{i,t} + \beta_2 BM_{i,t} + \beta_3 RD_{i,t} + \beta_4 EP_{i,t} + \beta_5 PastRet + \beta_6 Lev \\ & + \beta_7 ACC_{i,t} + \beta_8 CF_{i,t} + \mu''_{i,t} \end{aligned} \quad (9)$$

$$\begin{aligned} RET_{i,t+1} = {} & \beta_0 + \beta_1 Size_{i,t} + \beta_2 BM_{i,t} + \beta_3 RD_{i,t} + \beta_4 EP_{i,t} + \beta_5 PastRet + \beta_6 Lev \\ & + \beta_7 ACC_{i,t} + \beta_8 CF_{i,t} + \beta_9 Sales_{i,t} + \beta_{10} SG_{i,t} + \beta_{11} Capex_{i,t} + \beta_{12} CapexG_{i,t} + \mu'''_{i,t} \end{aligned}$$

(10)

We define accruals and operating cash flows as follows. Calculation of accruals (*ACC*) uses the income statement and balance-sheet approach and follows equation (10):

$$\begin{aligned} ACC_{i,t} = {} & \left(\Delta CA_{i,t} - \Delta Cash_{i,t}\right) - \left(\Delta CL_{i,t} - \Delta STDebt_{i,t} - \Delta Div_{i,t} - \Delta Int_{i,t} - \Delta Tax_{i,t}\right) \\ & - DEP_{i,t} \end{aligned} \quad (11)$$

where:

ΔCA	:	is the change in total current assets (Worldscope datatype *wc02201*);
$\Delta Cash$	:	is the change in cash and equivalents (Worldscope datatype *wc02001*);
ΔCL	:	is the change in total current liabilities (Worldscope datatype *wc03101*);
$\Delta STDebt$	:	is the change in total short term debt and current portion of long term debt (Worldscope datatype *wc03051*);

ΔDiv : is the change in dividends payable (Worldscope datatype *wc03061*);

ΔInt : is the change in interest payable (Worldscope datatype *wc03062*);

ΔTax : is the change in income taxes payable (Worldscope datatype *wc03063*); and

DEP : is depreciation, depletion and amortization (Worldscope datatype *wc01151*).

For the earnings (*OPINC*) measure, we use the Worldscope operating income (*wc01250*) definition. Cash flows (*ACC*) are calculated as the difference between *OPINC* and *ACC*. All these variables are deflated by the average of beginning and end-of-year book value of total assets (Worldscope datatype *wc02999*).

The other variables are defined as below:

$Ret_{i,t+1}$: is the annual return of firm *i*, starting six months after the end of the financial year end *t*; if a company delists during this period it is assumed that the following returns are 0;

$Size_{i,t}$: is the log of market value of firm *i* six months after the end of the financial year end *t*;

$BM_{i,t}$: is the total equity (Worldscope code *wc03501*) deflated by market value for firm *i* determined six months after the financial year-end *t*;

$RD_{i,t}$ is the total research and development expenses (Worldscope code *wc01201*) deflated by market value for firm *i* determined six months after the financial year-end *t*;

$EP_{i,t}$: is the operating income (*Worldscope* code wc01250) deflated by market value for firm *i* determined six months after the financial year-end *t*;

$PastRet_{i,t}$: is the eleven months cumulative monthly returns starting twelve months and ending one month before the month when annual returns start being accumulated for firm *i* at the financial year-end *t*;

$Lev_{i,t}$: is total debt (Worldscope code *wc03255*) deflated by market value for firm *i* determined six months after the financial year-end *t*;

$Sales_{i,t}$: is sales (Worldscope code *wc01001*) deflated by total assets at the beginning of year *t*, for firm *i*.

$SG_{i,t}$: is the change in sales deflated by total assets at the beginning of year *t*, for firm *i*.

$Capex_{i,t}$: is capital expenditures (*Worldscope* code wc04601) deflated by total assets at the beginning of year *t*, for firm *i*.

$CapexG_{i,t}$: is the change in capital expenditures deflated by total assets at the beginning of year *t*, for firm *i*.

As alternative tests not strictly within the Mishkin (1983) test framework developed above, we also substitute accruals and cash flow rank dummy variables for the accruals and cash flow variables in regression (10). Such tests can be seen within a general approach which suggests rational pricing implies that past accounting data, or transformations of such data, should not be able to forecast future abnormal returns. Hence, we transform equation (10) by sequentially replacing the accruals and cash flow variables by annual decile ranks. We thus test the following equations:

$$\begin{aligned} RET_{i,t+1} = \beta_0 + \beta_1 Size_{i,t} + \beta_2 BM_{i,t} + \beta_3 RD_{i,t} + \beta_4 EP_{i,t} + \beta_5 PastRet + \beta_6 Lev_{i,t} \\ + \sum_{j=2}^{10} \gamma_j ACCDEC_{i,t,j} + \beta_8 CF_{i,t} + \beta_9 Sales_{i,t} + \beta_{10} SG_{i,t} \\ + \beta_{11} Capex_{i,t} + \beta_{12} CapexG_{i,t} + \mu''''_{i,t} \end{aligned} \tag{12}$$

and

$$\begin{aligned} RET_{i,t+1} = \beta_0 + \beta_1 Size_{i,t} + \beta_2 BM_{i,t} + \beta_3 RD_{i,t} + \beta_4 EP_{i,t} + \beta_5 PastRet + \beta_6 Lev_{i,t} \\ + \beta_7 ACC_{i,t} + \sum_{j=2}^{10} \eta_j CFDEC_{i,t,j} + \beta_9 Sales_{i,t} + \beta_{10} SG_{i,t} \\ + \beta_{11} Capex_{i,t} + \beta_{12} CapexG_{i,t} + \mu'''''_{i,t} \end{aligned} \tag{13}$$

where $ACCDEC_{i,t,j}$ and $CFDEC_{i,t,j}$ are the accruals and cash flow ranks for firm i at time t, respectively.

We adopt two estimation approaches. The first involves estimating our regressions using ordinary least squares estimates of coefficients, and time and firm clustered standard errors. Peterson (2009) and Gow *et al*. (2010) both suggest the use of clustered standard errors in panel data, although the advice is not unequivocal as to the superiority of this estimation technique over others. As a consequence, the second estimation approach involves using the standard Fama and MacBeth (1973) approach to estimating coefficients and their standard errors.[6] Both estimation techniques, in particular, have some capacity to deal with the time effects likely to be present in the data.

To examine the effect of extreme observations on our analyses, we also estimate our regressions on two datasets. The first dataset uses untreated data. The second dataset uses winsorised data, with variables (other than dummy variables) winsorised at the 1% and 99% percentile levels.

Data used in this paper are derived from three different sources. Market data (stock returns and market value) are retrieved from Datastream, and are complemented by the London Share Price Database, which provides delisting reasons, given that this is the

[6] We could have opted for the use of a two-way fixed effects model controlling for firm and time effects. However, Petersen (2009) warns that, if the observation clustering is not perfect (e.g. non-constant time or firm effects), using a two-way fixed effects model will still produce biased standard errors. Thus, he advocates a less parametric estimation by calculating standard errors clustered by time and firm. This is the option adopted here.

only source of complete delisting information for the UK stock market.[7] For accounting information, Worldscope is used as the data source. We restrict our analysis to firms listed on the London Stock Exchange, listed in £GBP, that are non-financial firms (Datastream *ICBIC* datatype different from 8000), and have information in both Datastream and Worldscope for the financial years of 1990-2007. The final sample is comprised of 21,034 firm-years which have data for all the variables of interest.

4 RESULTS

We start our analysis by providing a description of the sample in Table 1 in terms of how annually ranking firms by accruals is associated with the independent variables used in our analyses.

Table 1

Consistent with Soares and Stark (2009), who use data from 1989 to 2004, ranking firms by accruals produces a negative association with operating cash flows and annual returns. With respect to the measures we use to capture risk effects, accruals rankings have an inverted U-shaped relationship with *Size*, *BM* and *EP*, again consistent with Soares and Stark (2009). Regarding *PastRet*, whilst not completely monotonic, there seems to be a positive relation with accruals deciles. The relationship with *Lev*, although unclear to a certain extent, appears to be an inverted U-shaped. It is only with *RD* that a

[7] When a stock's death assigned by LSPD is 7, 14, 16, 20 or 21, the return for the delisting month is considered to be -1 and the market value is set to missing subsequently.

relatively clearcut relationship exists, if confined primarily to the lower numbered accruals deciles, with the relationship being negative.

Table 1 suggests other possibilities for the accruals effects found in Soares and Stark (2009), however. Although accruals rankings appear to have a U-shaped relationships with *Sales*, and with *CapexG*, they do appear to have a broadly positive relationship with *SG* and a negative relationship with *Capex*, although the results for accruals decile 10 are in contradiction to this general trend. As a consequence, apparent accruals mis-pricing effects could also be related to a failure to control for variables that could help predict future earnings.

Table 2

In Table 2 we provide Pearson (*Spearman*) correlation coefficients between the variables that are used in the paper. There is little evidence of sizable correlations between the variables specifically of interest in this study (*ACC* and *CF*) and the other independent variables. As a consequence, it is unlikely that multicollinearity will be a problem for our estimated regressions. Additionally, the magnitude of the Spearmen correlation coefficients is sometimes different when compared with the results reported for the Pearson correlation coefficients. This hints at the possibility of extreme observations influencing the correlations and, also, any subsequent analyses using untreated data.

Table 3

Table 3 provides the results of estimating equations (8) to (10). Panel A provides estimates on both raw and winsorised data using OLS coefficients with time and firm clustered standard errors. Panel B provides coefficient and standard error estimates using the Fama and MacBeth (1973) approach. Coefficients that are significant at the 5% level, using a two-tailed test, are represented in bold type. Coefficients that are significant at the 10% level, using a two-tailed test, are represented in italicised type. Equations (9) and (10) represent Mishkin (1983) tests.

When dealing with raw data, the picture is straightforward. For the results using OLS coefficients and time and firm clustered standard errors, there are no significant coefficients, whether they be risk control variables, accruals or cash flow variables, or additional forecasting variables. When using the Fama and MacBeth (1973) approach, neither accruals nor cash flow have significant coefficients. Further, none of the additional forecasting variables are significant. The ratio of research and development expenditures is significant for all model specifications, with past returns becoming more significant as the equation estimated moves from (8) to (10).

The picture is much changed when winsorised data are used. First, for the results using OLS coefficients and time and firm clustered standard errors, some of the risk control variables become significant. In particular, the ratio of research and development expenditures is significant for all model specifications. The ratio of earnings to price and the ratio of book to market are significant in particular specifications, with the latter, whilst only significant at the 10% level for equations (8) and (9), significant at the 5% level for equation (10). One of the additional forecasting variables, capital expenditure growth, has a significant and negative coefficient at the 5% level, with sales growth having a negative coefficient which is significant at the 10% level. With respect to the variables of interest, the accruals variable stays insignificant, but the cash flow variable now has a significantly positive relationship with returns, whether it is equation (9) or (10) being estimated.

When using the Fama and Macbeth (1973) approach, the picture is similar. More risk control variables become significant (past returns and the earnings to price ratio become consistently significant, along with leverage becoming significant at at least the 10% level in all equations, with the book to market ratio ceasing to have significant explanatory power). Sales growth loses significance, even at the 10% level. But, the accruals variable still does not have a significant coefficient, and the cash flow coefficient is significant and positive, whether it is equation (9) or (10) being estimated.

What the results in Table 3 do suggest is that, if winsorised data are employed, there is a cash flow effect on annual returns. This result is robust to whether or not additional earnings forecasting variables are included. This suggests that, if there is an effect associated with earnings components on annual returns, it is due to the cash flow component. Further, it is incremental to a general earnings effect captured by *EP*. As pointed out earlier, however, it is not possible to conclude from these estimations if the cash flow effect is caused by any mis-forecasting with respect to cash flows specifically. Further, an alternative explanation is that the cash flow effect is caused by risk.

Overall, the results also contrast with those in Pincus *et al*. (2007), who find an accruals effect but no cash flow effect on UK data when ignoring the effect of trading costs. They use a number of methodologies. The first one involves a two-stage Mishkin test. The second one involves a methodology similar to the one here, although with fewer controls for risk. In particular, whilst they control for *Size*, *BM* and *EP*, they do not include controls for *RD*, *PastRet* and *Lev*. The failure to control for these other firm characteristics which do help explain returns to one extent or another in our sample could account for the difference in results.

Finally, there is some evidence of the additional forecasting variables being mis-priced. Nonetheless, the only consistently significant relationship, whichever estimation approach is used, is a negative one for growth in capital expenditure when using winsorised data.

To check the robustness of the results to alternative specifications of the accruals and cash flow variables, we additionally estimate equations (12) and (13). In these equations, we first substitute for *ACC* nine dummy variables corresponding to accruals rank deciles two through ten in equation (9). Second, we substitute for CF nine dummy variables corresponding to cash flow rank deciles two through ten. We maintain the presence of the risk control variables and the other forecasting variables. The results are shown in Table 4, with only the results for the accruals and cash flow variables being reported. The results for the risk variables and additional forecasting variables have the same qualitative characteristics as those reported in Table 3.

Table 4

When considering the impact of accruals decile rank dummies, if raw data are used, the results are similar to those found in Soares and Stark (2009) for annual returns, whichever estimation method is used. The coefficients of accruals rank deciles seven (nine to ten) to ten are negative and are individually significant at a 5% level if OLS coefficients and time and firm clustered standard errors (the Fama and MacBeth, 1973, approach) are used. The coefficient of accruals decile rank six (seven and eight) is negative and significant at the 10% level. The coefficient of cash flow is negative and significant if OLS coefficients and time and firm clustered standard errors are used, whereas it is negative and insignificant if the Fama and MacBeth (1973) approach is employed.

If winsorised data are used, however, none of the accruals decile rank dummies are significant, whichever estimation approach is employed.[8] Further, as in Table 3, a significantly positive coefficient for cash flow is estimated, again whichever estimation approach is adopted.

When cash flow decile rank dummies are used, a significant, but *positive*, coefficient for the accruals variable is observed when using raw data, but this result is not consistent across estimation approaches. When winsorised data are used, neither estimation approach produces a significant coefficient for the accruals variable. For both sets of

[8] An F-test suggests that the accruals decile rank dummies do jointly and significantly add explanatory power, however.

data, there is a generally positive, if not monotonic, trend in the coefficients of the cash flow decile dummies as the cash flow decile ranks move from low to high. For both sets of data, however, none of the cash flow decile dummy coefficients are significant when OLS coefficients and time and firm clustered standard errors are employed. When, the Fama and MacBeth (1973) approach is used, there are no significant coefficients when raw data are used, but cash flow decile rank dummies six through ten are positive and significant at the 5% level when winsorised data are used.[9]

Overall, there is little evidence for an accruals mis-pricing effect in which returns decline as accruals increase, once an extended set of risk controls are taken into account. In fact, there is stronger evidence suggesting that, in fact, there is a cash flow effect in annual returns, even after risk controls have been taken into account. As indicated above, however, an alternative interpretation is that the accruals effect is not a separate effect, once the effects of other variables considered to predict future returns and/or future earnings are taken into account, whereas the cash flow effect is separate.

[9] When raw data are used, note that the coefficient of the cash flow decile rank two dummy is negative and fairly large, suggesting that the average returns for that decile are lower than those for the lowest decile. This effect largely disappears when winsorised data are employed.

5 CONCLUSIONS

In this paper, we apply a modified one-stage version of the Mishkin (1983) test to companies in the UK stock market in order to investigate the presence or otherwise of the accruals anomaly in UK firms' annual returns. We apply the test using an expanded set of risk controls, relative to prior research, that have been found to have the ability to predict returns in the UK.

For the period of 1990-2007, we report that there is little evidence of a general accruals anomaly in the UK, in which accruals have a negative relationship with future returns, once risk and other potential forecasting variables have been accounted for. We also provide evidence that, after winsorising extreme observations, there is a cash flow anomaly in the UK stock market. We also find evidence in favour of an anomaly with respect to capital expenditure growth. Another interpretation is that the accruals anomaly is not distinct from other anomalies in the UK market, whereas the cash flow (and the capital expenditure growth) anomaly is.

Whether the cash flow and capital expenditure growth effects on returns are evidence of actual anomalies is an interesting issue. One further possibility is that they capture elements of risk not captured by the risk controls employed. .If such an explanation is accepted, our results can be interpreted as suggesting the possibility of, for example, a conditional capital asset pricing model, in which quite a number of firm characteristics act as conditioning variables. Should this be the case, it suggests that empirical asset pricing models need to be fairly complex to capture the effects of conditioning variables in generating estimates of abnormal returns in the UK (and, possibly, elsewhere). Investigating this possibility is a potentially interesting route for future research.

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Table 1

The Associations Between Ranking Firms By Accruals and the Independent Variables

AccDec	*ACC*	*CF*	*Ret*	*Size*	*BM*	*EP*	*PastRet*	*RD*	*Lev*	*Sales*	*SG*	*Capex*	*CapexG*
1	-0.285	0.138	0.178	9.732	0.286	-0.237	0.071	0.033	0.694	1.847	0.435	0.121	0.045
2	-0.130	0.133	0.153	10.481	0.557	-0.037	0.100	0.025	0.713	1.465	0.108	0.099	0.021
3	-0.091	0.121	0.097	10.952	0.707	0.012	0.115	0.017	0.636	1.594	0.296	0.086	0.012
4	-0.066	0.119	0.123	11.277	0.649	0.053	0.105	0.017	0.839	1.397	0.118	0.095	0.025
5	-0.048	0.107	0.108	11.419	0.712	0.064	0.115	0.019	0.724	1.383	0.138	0.078	0.014
6	-0.032	0.091	0.108	11.475	0.640	0.082	0.118	0.015	0.546	1.295	0.144	0.074	-0.005
7	-0.015	0.072	0.074	11.183	0.836	-0.017	0.097	0.044	0.572	1.218	0.113	0.072	0.011
8	0.005	0.053	0.081	10.958	0.746	0.051	0.111	0.021	0.415	1.376	0.219	0.064	0.009
9	0.041	0.005	0.061	10.629	0.559	0.063	0.146	0.015	0.581	1.597	0.268	0.074	0.020
10	0.347	-0.338	0.042	10.269	0.340	0.044	0.203	0.014	0.450	3.039	1.549	0.114	0.062
Total	-0.028	0.050	0.103	10.837	0.603	0.008	0.118	0.022	0.617	1.621	0.338	0.088	0.021

Table 2

Pearson (Lower Diagonal) and Spearman (Upper Diagonal) Correlations Between Independent Variables

	ACC	*CF*	*Ret*	*Size*	*BM*	*EP*	*PastRet*	*RD*	*Lev*	*Sales*	*SG*	*Capex*	*CapexG*
ACC		**-0.454**	**-0.041**	**0.061**	**0.015**	**0.145**	**0.047**	**-0.033**	**-0.053**	**0.062**	**0.209**	**-0.046**	**0.088**
CF	**-0.993**		**0.150**	**0.323**	**-0.161**	**0.456**	**0.225**	**-0.030**	**-0.027**	**0.307**	**0.110**	**0.286**	**0.046**
Ret	0.007	-0.009		**0.079**	**0.067**	**0.154**	**0.102**	0.009	**0.023**	**0.052**	**-0.037**	**0.028**	**-0.047**
Size	-0.002	**0.035**	**-0.031**		**-0.274**	**0.207**	**0.318**	**0.130**	**-0.053**	0.007	**0.128**	**0.262**	**0.120**
BM	-0.001	0.003	0.001	**-0.046**		**0.235**	**-0.281**	**-0.093**	**0.314**	**-0.179**	**-0.220**	**-0.081**	**-0.102**
EP	0.004	**0.015**	-0.001	**0.101**	**-0.304**		**0.065**	**-0.091**	**0.321**	**0.298**	**0.115**	**0.184**	**0.016**
PastRet	0.000	0.006	-0.009	**0.152**	**-0.037**	**0.044**		**-0.033**	**-0.207**	**0.114**	**0.143**	**0.062**	**0.074**
RD	-0.001	-0.006	-0.003	**-0.045**	**0.264**	**-0.928**	**-0.025**		**-0.093**	**-0.112**	**-0.074**	**-0.031**	**-0.021**
Lev	-0.001	0.000	-0.007	**-0.072**	**-0.242**	**-0.106**	**-0.045**	**0.079**		**0.014**	**-0.126**	**0.027**	**-0.101**
Sales	0.000	0.003	0.001	-0.004	-0.006	0.006	0.006	-0.003	-0.004		**0.434**	**0.207**	**0.114**
SG	0.001	0.001	0.000	0.001	-0.002	0.001	0.003	-0.001	-0.002	**0.996**		**0.268**	**0.278**
Capex	-0.002	0.000	-0.022	0.011	-0.002	0.002	0.006	-0.005	-0.006	**0.261**	**0.264**		**0.449**
CapexG	0.000	-0.002	-0.022	0.005	-0.002	0.001	0.010	-0.002	-0.007	**0.246**	**0.248**	**0.921**	

Notes: Bold type indicates significance at the 5% level or better.

Table 3

Risk Control and Single-Stage Mishkin (1983) Test Results

	Risk Characteristics						**Main Variables**		**Other Control Variables**				**Adj R^2**	**F-test**
	Size	*BM*	*EP*	*PastRet*	*RD*	*Lev*	*ACC*	*CF*	*Sales*	*SG*	*Capex*	*CapexG*		
Panel A: Clustered standard errors														
Raw	-0.012	-0.001	-0.008	-0.004	-0.027	-0.002							0.001	
	(0.264)	(0.818)	(0.895)	(0.861)	(0.861)	(0.297)								
Winsorised	-0.002	*0.033*	**0.161**	0.046	**0.715**	-0.002							0.011	
	(0.745)	*(0.058)*	**(0.026)**	(0.195)	**(0.005)**	(0.901)								
Raw	-0.012	-0.001	-0.007	-0.004	-0.024	-0.001	-0.007	-0.009					0.001	
	(0.154)	(0.797)	(0.892)	(0.861)	(0.852)	(0.228)	(0.954)	(0.937)						
Winsorised	-0.008	*0.031*	0.071	0.041	**0.832**	-0.008	-0.012	**0.298**					0.020	
	(0.161)	*(0.069)*	(0.238)	(0.231)	**(0.000)**	(0.578)	(0.853)	**(0.000)**						
Raw	-0.011	-0.001	-0.008	-0.004	-0.026	-0.001	-0.013	-0.016	0.009	-0.008	-0.015	-0.024	0.001	4.500
	(0.181)	(0.831)	(0.877)	(0.854)	(0.835)	(0.246)	(0.909)	(0.891)	(0.438)	(0.460)	(0.677)	(0.533)		(0.001)
Winsorised	-0.006	**0.031**	0.067	0.044	**0.82**	-0.012	0.014	**0.275**	0.017	*-0.05*	0.154	**-0.532**	0.025	4.578
	(0.207)	**(0.040)**	(0.244)	(0.201)	**(0.001)**	(0.387)	(0.831)	**(0.000)**	(0.192)	*(0.061)*	(0.194)	**(0.000)**		(0.001)

Table 3 (cont'd)

Risk Control and Single-Stage Mishkin (1983) Test Results

	Risk Characteristics						**Main Variables**		**Other Control Variables**				**Adj R^2**	**F-test**
	Size	*BM*	*EP*	*PastRet*	*RD*	*Lev*	*ACC*	*CF*	*Sales*	*SG*	*Capex*	*CapexG*		
Panel B: Fama-MacBeth														
Raw	-0.013	-0.017	0.023	0.043	**0.536**	-0.002							0.039	
	(0.213)	(0.503)	(0.696)	(0.115)	**(0.009)**	(0.829)								
Winsorised	-0.004	0.021	**0.125**	**0.069**	**0.790**	*-0.019*							0.048	
	(0.536)	(0.124)	**(0.007)**	**(0.013)**	**(0.004)**	*(0.096)*								
Raw	-0.010	-0.013	0.043	*0.050*	**0.498**	-0.001	-0.143	-0.084					0.052	
	(0.199)	(0.542)	(0.282)	*(0.066)*	**(0.009)**	(0.869)	(0.160)	(0.589)						
Winsorised	-0.006	0.019	**0.095**	**0.067**	**0.819**	**-0.022**	-0.061	**0.151**					0.058	
	(0.246)	(0.170)	**(0.012)**	**(0.017)**	**(0.002)**	**(0.045)**	(0.418)	**(0.019)**						
Raw	-0.009	-0.012	0.042	**0.054**	**0.500**	-0.002	-0.150	-0.091	0.004	-0.002	0.027	-0.230	0.059	1.187
	(0.215)	(0.562)	(0.304)	**(0.048)**	**(0.010)**	(0.845)	(0.154)	(0.567)	(0.595)	(0.763)	(0.816)	(0.106)		(0.352)
Winsorised	-0.005	0.020	**0.091**	**0.066**	**0.797**	**-0.025**	-0.058	**0.143**	0.008	-0.022	-0.007	**-0.29**	0.068	4.923
	(0.326)	(0.130)	**(0.014)**	**(0.017)**	**(0.003)**	**(0.023)**	(0.492)	**(0.024)**	(0.366)	(0.152)	(0.930)	**(0.002)**		(0.008)

Notes: *p*-values in parenthesis. Bold type indicates significance at the 5% level or better. Italicised type indicates significance at the 10% level but not the 5% level. The F-test results are for whether the ‘Other Control Variables’ significantly add to explanatory power.

Table 4

Cash Flow and Accruals Decile Effects on Annual Returns

	ACCDEC2	*ACCDEC3*	*ACCDEC4*	*ACCDEC5*	*ACCDEC6*	*ACCDEC7*	*ACCDEC8*	*ACCDEC9*	*ACCDEC10*	*CF*	*Adj* R^2
Panel A: Clustered standard errors											
Raw	-0.016	*-0.066*	-0.036	-0.049	*-0.049*	**-0.085**	**-0.082**	**-0.107**	**-0.131**	**-0.004**	0.003
	(0.509)	*(0.052)*	(0.252)	(0.134)	*(0.081)*	**(0.044)**	**(0.035)**	**(0.002)**	**(0.000)**	**(0.006)**	
Winsorised	0.022	-0.003	0.024	0.018	0.019	0.002	0.006	0.000	0.016	**0.274**	0.025
	(0.168)	(0.868)	(0.353)	(0.469)	(0.396)	(0.950)	(0.843)	(0.987)	(0.612)	**(0.000)**	
Panel B: Fama-MacBeth											
Raw	-0.015	-0.055	-0.027	-0.050	-0.041	*-0.075*	*-0.081*	**-0.107**	**-0.146**	-0.124	0.067
	(0.613)	(0.112)	(0.380)	(0.195)	(0.250)	*(0.096)*	*(0.094)*	**(0.042)**	**(0.027)**	(0.433)	
Winsorised	0.018	-0.007	0.015	-0.003	0.006	-0.015	-0.020	-0.028	-0.038	**0.113**	0.075
	(0.264)	(0.644)	(0.452)	(0.882)	(0.731)	(0.517)	(0.476)	(0.260)	(0.163)	**(0.038)**	

Table 4 (cont'd)

Accruals and Cash Flow Decile Effects on Annual Returns

	ACC	*CFDEC2*	*CFDEC3*	*CFDEC4*	*CFDEC5*	*CFDEC6*	*CFDEC7*	*CFDEC8*	*CFDEC9*	*CFDEC10*	*Adj* R^2
Panel C: Clustered standard errors											
Raw	**0.003**	-0.072	-0.003	-0.015	-0.014	0.031	0.044	0.044	0.038	0.083	0.003
	(0.000)	(0.410)	(0.964)	(0.874)	(0.879)	(0.742)	(0.629)	(0.609)	(0.652)	(0.294)	
Winsorised	-0.092	-0.008	0.030	0.017	0.015	0.048	0.064	0.058	0.055	0.092	0.021
	(0.363)	(0.822)	(0.509)	(0.767)	(0.779)	(0.449)	(0.318)	(0.360)	(0.395)	(0.162)	
Panel D: Fama-MacBeth											
Raw	-0.038	-0.062	0.014	0.005	-0.002	0.035	0.042	0.036	0.032	0.065	0.063
	(0.511)	(0.382)	(0.793)	(0.935)	(0.977)	(0.621)	(0.552)	(0.628)	(0.643)	(0.363)	
Winsorised	-0.037	0.013	*0.060*	0.056	0.053	**0.083**	**0.099**	**0.092**	**0.089**	**0.119**	0.075
	(0.664)	(0.646)	*(0.072)*	(0.133)	(0.139)	**(0.044)**	**(0.021)**	**(0.038)**	**(0.028)**	**(0.005)**	

Notes: *p*-values in parenthesis. Bold type indicates significance at the 5% level or better. Italicised type indicates significance at the 10% level but not the 5% level.