Centre for Global Finance
Working Paper Series (ISSN 2041-1596)
Paper Number: 04/10

Title:

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The Role of Accruals and Cash Flows in Explaining UK Stock Returns and the Impact of Auditor Quality

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Abstract

In this paper, we examine the importance of cash flow and accruals earnings components in explaining the variation in UK company stock returns and the extent to which this varies by auditor quality. In general, prior UK evidence is mixed with both earnings components being value relevant to differing degrees. Since much of the prior research on this topic was conducted, however, there have been major improvements in cash flow reporting as a result of the UK Accounting Standards Board's *FRS 1: Cash Flow Statements*. Furthermore, recent survey evidence suggests that the use of cash flow valuation models is becoming more widespread among the UK investment community. Since one of the main reasons for using cash flow models is the subjectivity involved in relying on accruals-based information, we examine whether auditor quality affects the importance of accruals and cash flow in driving stock returns. Our results indicate that both components of earnings are important drivers of stock returns, though, unlike recent US-based evidence, cash flows are more influential than accruals. Our findings also suggest that the significance of both earnings components is higher for high-quality auditors.

Keywords: accruals; auditor quality; cash flows; variance decomposition

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1. INTRODUCTION

This paper examines the relative importance of earnings and cash flow in explaining the variance of unexpected UK stock returns using a variance decomposition approach. The debate surrounding the importance to stock market participants of accounting information in general, and accruals and cash flows in particular, has an established history in the accounting literature (e.g. Ball and Brown, 1968; Wilson, 1986; Board and Day, 1989; Easton and Harris, 1991; Ali et al., 1995; Charitou and Edwards, 1990; Dechow, 1994) and results have been somewhat contradictory. It is generally accepted that earnings play an important part in investors' valuation models - for example, as part of fundamental analysis based on the price earnings ratio (e.g. Arnold and Moizer, 1984; Barker, 1999). However, standard valuation techniques and models widely used in practice also emphasise the role of cash flow information in valuing companies, and recent evidence points to cash flow models becoming more important over time (Demirakos et al., 2004; Imam et al., 2008). This might be because of concerns over the reliability of accruals information (e.g. Dechow, 1994) and/or because of improvements in the quality of cash flow reporting over time (e.g. Gosh, 1997).

In the absence of potentially distortive choices, the accruals components of earnings provides useful information to financial statement users in addition to operating cash flows, since accruals capture potentially value-relevant changes in balance sheet components ignored by cash-based accounting. However, since accruals are less persistent than cash flows (Sloan, 1996; Hewitt, 2009) and because preparers of financial statements often have incentives not to choose accounting policies that most faithfully represent the company's true economic performance (e.g. Graham et al., 2005), the value-relevance of accruals may be lower than cash flows. In light of the arguments in favour of both accruals and cash flows being relevant

in equity valuation, it is perhaps unsurprising that prior research has produced inconsistent results (Garrod and Hadi, 1998).

In our analysis, we take a different view of the value relevance of earnings components than in prior UK research and employ the recent variance decomposition approach developed by Campbell (1991), Vuolteenaho (2002), Callen and Segal (2004), Callen et al. (2005) and Callen (2009). This approach can be viewed as complementary to the standard one, which usually draws inferences based on the magnitude of the earnings response coefficient (ERC) from a regression of returns on earnings and cash flows (or accruals and cash flows). In addition, in our examination of the importance of accruals and operating cash flows in explaining UK share returns, we use cash flow data prepared under a common cash flow reporting regime –i.e., *FRS 1: Cash Flow Statements* issued by the UK Accounting Standards Board in 1991. Using these data, we then examine whether the role of UK firm-level accruals and cash flows in driving equity share returns is conditional upon the quality of the firm's auditor. This research question is based upon reports in previous research that high quality auditors are more effective in constraining aggressive accruals (e.g., Becker, 1998; Francis et al., 1999), which is likely to lead to differential value relevance by auditor type. In addition, there is some evidence in the US that the pricing of earnings differs according to (perceived) audit quality (Teoh and Wong, 1993; Krishnan, 2003), though the results are not conclusive (Ghosh et al., 2009).

Building on Callen and Segal (2004), who find some evidence that in the US, accruals components of earnings are more important drivers of stock returns than cash flow components, this paper offers a number of contributions. First, this is the first paper to use a variance decomposition approach to investigate the role of accruals and cash flow prepared under a common cash flow regime (*FRS 1 Cash Flow Statements*) and with data taken directly from the cash flow statement (rather than from noisier balance sheet estimates; see Hribar and

Collins, 2002).[1] This study thus represents the first application of the variance decomposition approach outside the US and although the UK and the US are often grouped together in accounting classifications due to the many similarities in both accounting systems, empirical research shows that the properties of earnings can differ markedly.[2] The variance decomposition approach of Callen and Segal (2004) has several advantages over more conventional regression approaches, not least the fact that mean responses captured by earnings response coefficients can be an incomplete metric for assessing value relevance (Callen, 2009). Furthermore, the variance decomposition approach that we employ incorporates time varying discount rates, which is likely to be important in this context (e.g. Collins and Kothari, 1989; Ali and Pope, 1995; Callen et al., 2005).

Second, we examine the effect of audit quality on the accounting/returns relationships. We follow Teoh and Wong (1993) and Gul et al. (2003) in using a large auditor classification (big 5/big 4) as a proxy for higher quality auditors since there is evidence in prior literature suggesting that large (big 4) auditors produce higher quality audits (Davidson and Neu, 1993), are more accurate (Lennox, 1999) and constrain earnings management behaviour more (Becker et al., 1998; Francis et al., 1999).[3] In particular, we examine whether the relationship between cash flows and accruals and stock returns is stronger for higher quality audit clients. Our hypotheses are based on the idea that in aggregate and in isolation, the variance of earnings components of firms audited by a higher quality auditor will contribute more to the variation in unexpected stock returns than of firms audited by a low quality auditor.

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[1] Although a cost of this is that it reduces sample size. Nevertheless, as discussed below, our sample size still compares favourably with those in prior research in this area.

[2] For instance, Pope and Walker (1999) find significant differences in the timeliness and conservatism of earnings in the UK and US, potentially due to extraordinary items and/or the speed at which good news in recognised in earnings.

[3] Though we recognise that audit quality is a multi-dimensional construct including not just the large auditor dichotomy, but also factors such as industry expertise and ratio of non-audit to audit fees (e.g., see Francis, 2004). The large auditor classification is our preferred measure because it has been so widely used in prior empirical research and because our methodology requires a measure that is reasonably stable over time.

The third contribution of this paper is to extend the variance decomposition analysis of Callen and Segal (2004) by using an estimation procedure which removes the influence of the covariance terms from the variance decomposition. This innovation makes interpretation of the variance effects easier in the absence of strong theoretical predictions of which earnings component should dominate.

The remainder of the paper is organised as follows. In the following section, we review prior literature on the role of earnings and cash flow information in explaining equity returns and outline the variance decomposition approach and how this differs from the conventional methodology of linear regression of equity returns on accounting variables. Section 3 describes our methods and data while our results are presented in section 4. In the final section, we offer some conclusions and discuss limitations and areas for further research.

2. PRIOR LITERATURE

(i) Usefulness of accruals and cash flow information in stock markets

The use of earnings information in stock market users' fundamental valuation models is well documented in the accounting literature. Indeed Barker (1999) reports the prevalence of the price/earnings ratio to be among the most pervasive findings in accounting research. A wide range of empirical studies dating back to Ball and Brown (1968) offers persuasive evidence that earnings are a significant determinant of equity returns. What is far from clear, however, is the extent to which analysts and investors rely on the accruals and cash components of earnings individually. Although, ultimately, cash is the measure of performance that investors are concerned with, over finite intervals, accruals have the advantage of being a less noisy measure because they are not as prone as cash flows to timing and matching problems (Dechow, 1994). Moreover, although a preference for discounted cash flow as a basis for equity valuation is often assumed, for some time, analysts have also been shown to place

more emphasise earnings in their investment reports (e.g. Govindarajan, 1980), perhaps in part because accruals are themselves informative about future cash flows, which are more important for equity valuation than current cash flows.

While the above argument suggests that accruals should be more relevant than cash flows, management has more discretion over the measurement of accruals, so the potential increase in relevance is threatened by managers' opportunistic behaviour. As Dechow (1994: 5) observes, 'to the extent that managers use their discretion to opportunistically manipulate accruals, earnings will become a less reliable measure of firm performance and cash flows could be preferable.' In the absence of a clear theoretical order of preference, therefore, the issue of whether cash flows or accruals are most value-relevant is best resolved through empirical research.

In US-based research, Wilson (1986) finds high (low) cash flow (accruals) components result in larger market response, though Bernard and Stober (1989) later find few consistent results and conclude it is difficult to model these relationships parsimoniously. Callen and Segal (2004) find that accruals and cash flows are both significant in driving returns and find some evidence that accruals are more important than cash flows. The difference between the two earnings components, however, is not always statistically significant.

It is not necessarily the case that US results necessarily apply to the UK, however, since prior research has found international differences in the analysis techniques used by investors (e.g. Arnold et al., 1984; Pike et al., 1993) and in the properties of the inputs into these analysis techniques (e.g. Pope and Walker, 1999). Prior UK findings into the relative importance of cash flow and earnings to stock market returns are mixed. There is evidence of both accruals (or earnings) and cash flows being relevant, but that there are differences across research design and over time – the latter being associated with various definitions of cash

flows prescribed by accounting standards. Based data for the period 1962-1977, Board and Day (1989) find that earnings have incremental explanatory power over cash flows, but not vice versa, and conclude that cash flow data convey very little information. Ali and Pope (1995) examine data for the 7 years between 1984 and 1990 employing a non-linear specification and allowing for intertemporal variation in parameters; they find that both performance measures have incremental information content for returns individually, though the coefficients for unexpected cash flows from operations do not have the predicted positive sign over all time periods studied. Based on a multivariate forecasting earnings/cash flow model and a sample of 48 firms over the period 1955-1984, Clubb (1995) concludes that accruals have information content beyond cash flows[4], though there was only weak evidence that cash flow data were useful to investors.

Garrod and Hadi (1998) represents the first study to examine the market's response to cash flow data prepared according to *FRS 1* - the first standard to require UK firms to report cash flow statements.[5] *FRS 1* overcame the criticism of *SSAP 10 Funds Flow Statements* - its predecessor - of providing rearranged data from the other financial statements and was well-received at the time (e.g. see Gosh, 1997). For instance, Davies et al. (1999: 1728) note 'Without doubt the publication of FRS 1 was a quantum leap in the ASB's financial reporting reform process. It generally worked well in practice and enhanced the quality of financial reporting considerably.' In line with prior US studies (e.g. Wilson, 1987), but in contrast to prior UK research (e.g. Board and Day, 1989), Garrod and Hadi (1998) found that unexpected operating cash flows had a statistically significant (at $p < 0.001$) positive coefficient in a returns regression. They also found that unexpected total accruals were significant and

[4] Note that Clubb (1995) uses a broader definition of cash flows (including operating, financing and investing) than most studies. Interestingly, he also finds some evidence in support of ERCs being positively related to earnings persistence estimates.

[5] Since Garrod and Hadi's (1998) sample period was before *FRS 1* was introduced (i.e., 1977-1991), it is however likely that the reconstruction of data from other disclosures introduces measurement error (Hussain, 2004: 862).

positive in the same regression, though only cash flow data were significant in both levels and changes when included simultaneously. Consistent with the conclusions of Garrod and Hadi, Ali-Attar and Hussain (2004) use data prepared under *FRS 1* and find that the disaggregation of earnings into cash flows and accruals generates superior explanatory power for future cash flows. They conclude (p. 902) that 'while current cash flow data appears to explain future cash flows better than do current earnings, the combination of cash flow and accruals data generates the greatest explanatory power.' Notwithstanding the differences in research design and definition of cash flow used, the improvements in the quality of reporting of UK cash flow information over time may have shifted the balance towards cash flow being perceived as more influential to stock market users' decisions.

Interestingly, more recent research based on surveys of the UK investment community also tends to suggest that cash flow information is becoming more important to UK investors over time. In an analysis of 104 UK analysts' reports by Demirakos et al. (2004) indicates that although a simple price-earnings (P/E) multiple is common, multiperiod models based on discounted cash flows (DCF) are more popular than earnings-based multiperiod models. Furthermore, in a survey of UK buy-side and sell-side analysts, Imam et al (2008) find that sophisticated cash flow models are significantly more important than those based on accruals, and that DCF models are ranked as the most dominant (compared to 12 other valuation models). They also find some evidence that operating cash flows are considered more important than earnings measures and that these findings can be partly attributed to perceived subjectivity in earnings compared to cash flow. Whether due to the perceived limitations of accruals or improved cash flow reporting, cash flow models appear to have become important to UK investors.[6]

[6] Rutterford's (2004) historical analysis of valuation techniques suggests that such preferences can be viewed as part of a long term movement as changes towards more use of discounted cash flow models have been taking place for decades.

In an attempt to re-examine the issue of whether accruals or cash flow-based information is more important in driving UK equity returns, the basis of the approach we adopt is that shocks (or revisions) to stock returns are related to shocks to earnings (Callen, 2009). Most prior research into the returns-earnings relationship involves linear regressions of (levels of and/or changes in) stock returns on earnings and their components, with inferences based on the magnitude of the cash flow or earnings response coefficient (e.g. see Habib, 2007 and references therein). As noted by Callen et al. (2005) and Callen (2009), however, such 'mean' effects can be an incomplete measure of value relevance and an examination of the relative variance contribution of earnings and their sub-component can be worthwhile. This is because even if a large and significant response coefficient is found for accruals and/or cash flows, the way returns respond to such factors depends on the magnitude of the coefficient *and* the variance of accruals and cash flows. It is therefore possible that a given earnings component may have a relatively large response coefficient, but if it does not vary substantially, *ceteris paribus*, it may have a relatively low impact on revisions to returns and *vice versa*.

Callen and Segal (2004, proposition 4; eqs. A17-A18) adapt the model of Vuolteenaho (2002) and demonstrate (*inter alia*) that unexpected changes in time *t* log cum-dividend excess stock returns (denoted r_t) can be expressed as a function of changes in expectations of the accruals component of earnings (denoted $acce_{t+j}$), changes in expectations of the cash flow component of earnings (denoted cfe_{t+j}) and changes in expected future returns as follows:

$$r_t^c - E_{t-1}\left(r_t\right) = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(cfe_{t+j} - f_{t+j}\right) + \Delta E_t \sum_{j=0}^{\infty} \rho^j acce_{t+j} - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} \qquad (1)$$

Where ρ is a constant error approximation term typically close to 1. Following on from equation (1) above, the variance of the unexpected returns can then be decomposed as follows:

$$\begin{aligned}\text{var}\left\{r_t^c - E_{t-1}\left(r_t^c\right)\right\} &= \text{var}\left(N_{r^c,t}\right) + \text{var}\left(N_{cfe,t}\right) + \text{var}\left(N_{acce,t}\right) - 2\,\text{cov}\left(N_{r^c,t}, N_{acce,t}\right) \\ &-2\,\text{cov}\left(N_{r^c,t}, N_{cfe,t}\right) + 2\,\text{cov}\left(N_{acce,t}, N_{cfe,t}\right)\end{aligned} \quad (2)$$

Where $N_{r^c,t}$ represents news about future returns (i.e., $\Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j}^c$), $N_{cfe,t}$ represents cash flow news (i.e., $\Delta E_t \sum_{j=0}^{\infty} \rho^j \left(cfe_{t+j} - f_{t+j}\right)$) while $N_{acce,t}$ represents accruals news (i.e., $\Delta E_t \sum_{j=0}^{\infty} \rho^j acce_{t+j}$).[7] Using Campbell's log-linear approach as a foundation, equation (2) thus provides an opportunity to estimate how the variance of stock returns is can be attributed to the main components of what is usually considered as the numerator of a typical earnings-based valuation model (i.e., the cash flow and accruals news) and what is typically the denominator, in the form of expected future return news.[8]

Our study is the first to employ the firm-level variance decomposition approach on accounting data outside the US. Our data are for a sample of UK listed companies involving taken directly from the statement of cash flows, as (then) required under *FRS 1*. Although the UK and US accounting regimes are often considered to be somewhat similar (for instance, both regimes are characterised by a heavy reliance on stock market finance, both have a well developed audit profession and both have national private sector accounting standard setting bodies – at least for the period we examine), research shows that the outputs of each system can be substantially different (e.g., Weetman and Gray, 1990). For instance, Pope and Walker

[7] As noted by Callen and Segal (2004), this development of Vuolteenaho's model requires the approximation $\ln(1+z) \approx z$; this approximation becomes less reliable the larger the value of *z*.

[8] Note that Campbell and Shiller's (1988a; 1988b) analysis, which is the precursor to Vuolteenaho's model, nests the more familiar Gordon growth model as a special case.

(1999) find differences between the UK and US in the timeliness properties of earnings, which are attributed to greater discretion over the treatment of extraordinary items before the introduction of *FRS 3: Reporting Financial Performance*. Although we have no clear prediction of systematic differences between the UK and the US, we nevertheless offer additional evidence on the extent to which the variance decomposition results of Callen and Segal (2004) generalise to a non-US jurisdiction.

(ii) Accounting information and auditor quality

The hypothesis above assumes that the relative importance of cash flow news and accruals news is unconditional or constant across firms. In this section, we discuss the idea that the variance contribution of accruals and cash flow is conditional upon the quality of the auditor attesting to the truth and fairness of the financial statements.

An obvious problem in investigating the effect of audit quality on the relationship between accounting and stock market variables is the unobservable nature of audit quality. An empirical proxy for audit quality is therefore necessary in order to operationalise the hypothesis. Such proxies generally measure perceived, rather than actual audit quality. As argued by Watkins et al. (2004), audit quality consists of two components: reputation (comprising *perceived* competence and independence) and monitoring strength (comprising *actual* competence and independence). The former results in a higher degree of user confidence in the financial statements (i.e., the information has a high degree of credibility), while the latter results in a closer correspondence between the information and the true economic circumstances (i.e., higher quality information). In our empirical analysis, we use auditor size as an indicator of audit quality following prior research. More specifically, we assume that large (big 4) auditors are associated with higher audit quality than small (non big 4) auditors, in line with suggestions in Titman and Trueman (1986), who show in the context

of initial public offerings that firm value is an increasing function of audit quality. Although this is a somewhat rudimentary representation of audit quality, it is one that is readily implementable and has been widely used in prior research (see, e.g., Becker et al., 1998; Clarkson, 2000; Krishnan, 2003). It is also a valid surrogate in that it has received considerable support from prior empirical research. Davidson and Neu (1993), for example, find support for the hypothesis that larger audit firms do indeed produce higher quality audits than smaller audit firms when auditing management earnings forecasts. In addition, Blokdijk et al. (2006) find evidence that the audit programs of large (big 5) audit firms are of a higher quality than those of small (non-big 5) audit firms, even though the amount of audit effort does not differ.

Although there have been no studies of the effect of auditor quality on the relative contribution of cash flow and accruals to variation in stock returns, there has been related research into the effect of auditor quality on the relationship between stock returns and earnings. Based on an adaptation of the model by Holthausen and Verecchia (1998), Teoh and Wong (1993) hypothesise that because investors attach more credibility to financial statements audited by higher quality auditors, the stock market reaction to earnings depends on the audit firm attesting that the financial statements show a true and fair view. Consistent with this hypothesis, they find that the earnings response coefficient of firms audited by large (big 8) auditors is significantly larger than the corresponding coefficient for firms audited by smaller auditors. These results also hold for a matched sample of big 8 and non-big 8 firms.

Based on the level of non-audit services, Gul et al. (2006) also find that the value relevance of earnings is affected by audit quality. In particular, for a sample of 840 Australian firms, they find that the earnings response coefficient is a decreasing function of non-audit service fees, and this relationship is strongest for small (non big 6) auditors. They call for more research into these issues in other environments, such as in the UK.

Overall, we therefore expect that the quality of a company's accounting data, which includes the cash flows and accruals information, will be more important in driving stock returns if the data are verified by large audit firms. We also expect that accruals will be relatively more important than cash flows in driving returns for clients of large auditors than small auditors. In the following section, we describe the sources of data and methodology used in our estimation procedures.

3. METHODOLOGY AND DATA

(i) Variance decomposition estimation

To estimate the contribution of the variance of cash flow news and accruals news to the variance of equity returns, we follow previous research (Campbell, 1991; Vuolteenaho, 2002; Callen and Segal, 2004; Callen et al., 2005) in using a log-linear vector-auto-regression (VAR). We assume that the vector of firm-specific state variables $z_{i,t}$ follows a multivariate one-period lagged log-linear vector auto-regressive process:

$$z_{i,t} = \mathbf{\Gamma} z_{i,t-1} + \boldsymbol{\eta}_{i,t}$$

The VAR coefficient matrix $\mathbf{\Gamma}$ is assumed to be constant over time and across firms (though we allow $\mathbf{\Gamma}$ to vary in our analysis of auditor quality) and $\boldsymbol{\eta}_{i,t}$ is a vector of zero-mean errors with a variance-covariance matrix $\mathbf{\Sigma} = E\left(\boldsymbol{\eta}_t \boldsymbol{\eta}_t^{'}\right)$.[9] It is important to note that this approach assumes that equity returns and their determinants are stationary (or at least cointegrated); however, as noted by Callen (2009), this assumption also underpins most standard tests of value relevance, including univariate time series tests and cross sectional tests with a time-component. The state variables that constitute $z_{i,t}$ are log excess returns (r_t) (i.e., net of the

[9] We assume that the state vector is constant across all firms, rather than across industries, because of the relatively small number of observations in each industry in our sample.

risk free rate), cash flow (cfe_t), accruals ($acce_t$) and the log book/market ratio (bm_t) as follows (all mean adjusted):

$$r_t = \alpha_1 r_{t-1} + \alpha_2 cfe_{t-1} + \alpha_3 acce_{t-1} + \alpha_4 bm_{t-1} + \eta_{1t} \quad (3)$$
$$cfe_t = \beta_1 r_{t-1} + \beta_2 cfe_{t-1} + \beta_3 acce_{t-1} + \beta_4 bm_{t-1} + \eta_{2t} \quad (4)$$
$$acce_t = \gamma_1 r_{t-1} + \gamma_2 cfe_{t-1} + \gamma_3 acce_{t-1} + \gamma_4 bm_{t-1} + \eta_{3t} \quad (5)$$
$$bm_t = \delta_1 r_{t-1} + \delta_2 cfe_{t-1} + \delta_3 acce_{t-1} + \delta_4 bm_{t-1} + \eta_{4t} \quad (6)$$

In general, we follow Callen and Segal's approach to provide estimates of the variance decomposition, though we use standard OLS (rather than WLS) regression to provide estimates of the coefficients in $\mathbf{\Gamma}$ and use bootstrapped, rather than jackknife, standard errors. Preliminary tests reveal that jackknife standard errors are not significantly different to those obtained via our bootstrapping procedure. Moreover, as noted in the introduction, we also employ an orthogonal variance decomposition method which has the appealing effect of facilitating easier interpretation of the variance decomposition estimates due to the removal of the influence of covariances terms. Details of this procedure are provided in Wong, (2008).

In line with Callen (2009) and based on equation (1) above, we estimate revisions in cash flows, accruals and expected future returns, respectively, as follows:

$$r_t - E_{t-1}(r_t) = \left(\mathbf{e}_2' + \boldsymbol{\eta}_2'\right)\boldsymbol{\varepsilon}_t + \left(\boldsymbol{\lambda}_3' + \boldsymbol{\eta}_3'\right)\boldsymbol{\varepsilon}_t - \boldsymbol{\eta}_1' \boldsymbol{\varepsilon}_t \quad (7)$$

And variance and covariance estimates from:

$$\begin{aligned} Var\left(r_t - E_{t-1}(r_t)\right) &= \left(\mathbf{e}_2' + \boldsymbol{\Sigma}_2'\right)\boldsymbol{\varepsilon}\left(\boldsymbol{\lambda}_2' + \boldsymbol{\varepsilon}_2\right) + \left(\boldsymbol{\lambda}_3' + \boldsymbol{\Sigma}_3'\right)\boldsymbol{\varepsilon}\left(\boldsymbol{\lambda}_3' + \boldsymbol{\varepsilon}_3\right) \\ &+ \boldsymbol{\lambda}_1' \boldsymbol{\Sigma} \boldsymbol{\lambda}_1 - 2\boldsymbol{\lambda}_1' \boldsymbol{\Sigma}\left(\mathbf{e}_2 + \boldsymbol{\lambda}_2\right) - 2\boldsymbol{\lambda}_1' \boldsymbol{\Sigma}\left(\mathbf{e}_3' + \boldsymbol{\lambda}_3'\right) + 2\left(\mathbf{e}_2' + \boldsymbol{\lambda}_2'\right)\boldsymbol{\Sigma}\left(\mathbf{e}_3 + \boldsymbol{\lambda}_3\right) \end{aligned} \quad (8)$$

Where $\boldsymbol{\lambda}_k' = \mathbf{e}_k' \rho \mathbf{\Gamma}\left(\mathbf{I} - \rho \mathbf{\Gamma}\right)^{-1}$, $\mathbf{e}_k'$ is a binary selection vector $\mathbf{e}_k' = [0,\ldots,1,\ldots,0]$ with 1 as the kth element and zeros elsewhere and ρ is a discount factor which, empirically, takes a value

close to 1. The variance and covariance terms set out in (8) are obtained from the variance-covariance matrix Σ in the manner set out in Callen (2009).[10]

(ii) Data

Our data are collected from two sources. First, we obtain equity returns, prices, firm size (market value) and the market to book ratio from *Datastream*. We use both live and dead company return files in order to mitigate the effects of survivorship bias. For the accounting information, i.e., cash flow from operations, accruals and book value data, we use the Financial Analysis Made Easy (FAME) database for the period 1996 – 2004. Firm-years with negative book value are discarded. This period is the longest for which we are able to obtain data due to the general lack of availability of time-series auditor information, cash flow data not being available on FAME before 1996 and the change to International Financial Reporting Standards by listed UK companies in 2005. Importantly, we also use the FAME data as reported on the disks as they were available since this also helps reduce the potential effects of survivorship bias. To mitigate the effects of data input errors, the distributions of the continuous variables are winsorised at the 1st and 99th percentiles, in line with prior research in this area.

An important feature of our data set is that we compute accruals directly from the cash flow statement and income statement rather than from the balance sheet. We define accruals as the difference between profit after tax and cash flows from operations (as defined by *FRS 1: Cash Flow Statements*). Our approach is therefore one that captures total accruals, consistent with Hribar and Collins (2002), who note that this approach results in a more

[10] Note that in the literature, this is referred to as the 'direct' way of estimating accruals news and cash flow news. As Callen and Segal (2004) and Callen (2009) note, it is also possible to estimate these statistics using an alternative (residual) formulation, yielding results that are theoretically (but not necessarily empirically) equivalent to (7). We discuss this issue in more detail further below.

precise measurement of accruals because using balance sheet estimates can be seriously affected by non-articulation in the presence of mergers, acquisitions and translation of foreign subsidiary accounts.[11]

Insert Table 1 about here

Table 1 provides descriptive statistics for our main sample of 3,646 firm years (for 792 firms) and for the two sub-groups based on auditor size. We note that large auditor concentration is high at 81%, consistent with prior research for the UK listed sector (e.g. Pong, 199; and Clatworthy and Peel, 2007). Table 1 shows that simple annual returns have a mean and median of approximately 16% and 5% respectively; these are broadly in line with corresponding figures reported by Pope and Walker's (1999) UK sample of 16% and 9% respectively and also with the US sample of Callen et al. (2005) at 17% and 8%.

A comparison of the statistics in Panels B and C show that there are significant differences between the means of accruals, cash flow and the book to market ratio (these differences are statistically significant at $p < 0.05$). Most notable is the difference in the average size of companies in the two auditor categories, which is significant at $p < 0.001$. This difference is potentially important to control for since it is well known that the relationships we are interest in are themselves a function of firm size, which could lead to us incorrectly attributing differences in the importance of accounting information to auditor characteristics when they are in fact due to variation in firm size. To allow for this, we therefore create a sample of firms audited by large auditors that is matched on the basis of the probability of selecting a large auditor generated by a probit model, where the choice is a function of the natural log of market value. In particular, we use the propensity score matching (psmatch2) routine in Stata to obtain the probabilities of selecting a large auditor

[11] Indeed, Hribar and Collins (2002: 133) conclude that results of research into the particular issue of differential capital market effects of cash flows and accruals might be biased against rejection of the null hypothesis by use of balance sheet estimates of accruals.

and to find a firm in the large auditor sample with a probability of selecting a large auditor closest to that for the small auditor sample for each individual firm. This produces a sample of 676 companies audited by large auditors, yet the firms are of a very similar size (market value) to the 676 companies in the small auditor sample. As can be seen in Panel 3 of Table 1, the distributions of the size variables for the two samples are very similar (and do not differ significantly at $p < 0.05$) with means of 6,158 for the small auditor sample and 6169 for the large auditor sample (with identical standard deviations).

4. RESULTS

Our results based on the variance decomposition analysis are presented in Tables 2 and 3. Since no prior research has conducted a variance decomposition of UK equity returns, Table 2 shows the unconditional results (i.e., with no split by auditor type). Table 3 reports results for large auditors and small auditors both with and without matching on the basis of firm size.

Insert Table 2 about here

The VAR coefficient matrix in Panel A of Table 2 includes estimates which are broadly in line with those in Callen and Segal (2004), which are based on US firms. For instance, for the overall sample, the persistence of stock returns is low, whereas lagged values of the book to market are the most important determinants of the current book to market ratio. Furthermore, returns are high when the book to market ratio is high, and accruals are less persistent than cash flows; the latter finding is also in line with prior research in to the persistence of earnings components (e.g. Sloan, 1996).

The variance decomposition results for the whole sample of 3,646 firms presented in Table 3 Panel B indicate that return news (variance of 0.032) cash flow news (variance of 0.549) and accruals news (0.256) are all statistically significant at ($p < 0.01$) in driving unexpected current stock returns (for all estimates, inferences are based on bootstrapped

standard errors). In addition, the difference between the variances of cash flows news and the accruals news of 0.292 is also significant at $p < 0.01$. Although the finding that all three types of news variances are significant is consistent with Callen and Segal's (2004) US-based study using the same methodology, this latter finding is inconsistent (Callen and Segal report that accruals are generally more important, but there were no significant difference between the two). This result remains when the orthogonalised variance decomposition is used, (i.e., when the impact of the covariance terms is reduced): the difference falls to 0.231, but it remains statistically significant at the 0.001 level.

In general, therefore, the fact that all variances (i.e., return news, cash flow news and earnings news) are statistically significant indicates that our results share some similarities with Callen and Segal (2004). The main difference is that cash flow news rather than accruals news dominates. Our results also contrasts with early UK research based on ERCs which suggests that cash flow plays a less influential role (e.g. Board and Day, 1989; Charitou et al., 2001). They are, however, in line with the increasing importance of cash-flow based models reported in the prior UK literature (e.g. Rutterford, 2004) and with the recent survey evidence of Imam et al. (2008) that UK investors prefer sophisticated cash flow models to sophisticated earnings-based models.

Insert Table 3 about here

The results for sub-samples created on the basis of auditor type are reported in Table 3. Turning to the main variance decomposition results, the influence of returns news of the large and small auditees appears similar (0.030 and 0.041) and is significant in both cases. However, both earnings and cash flow components are more influential for large auditors than for small auditors, irrespective of whether the samples are size matched. For the large auditor (unmatched) sample, the variance of cash flow news (0.616) is over twice that of the small auditor sample (0.273). Moreover, even when the large and small auditor groups are of similar

size, the cash flow news variance of 0.343 for large auditor clients is still considerably higher than for small auditor clients. A similar picture emerges for accruals news: for the unmatched large auditor sample, the accruals news variance of 0.306 is almost three times as large as that for the small auditor clients (0.105). Turning to the results for the size-matched sample, there is evidence suggestive that the difference is partly explained by size differences between the two groups, though the accruals variance for the large auditor sample of 0.203 remains almost twice the level for the small auditor sample. Although both cash and accruals components are more influential for the large auditor sample, there is no evidence that accruals are relatively more important when the financial statements are audited by a higher quality auditor.

Overall, to the extent that accruals and cash flow news is more important for large auditors than small auditors, our findings are broadly supportive of those provided by standard regression-based techniques by Teoh and Wong (1993) for the US and by Gul et al. (2003) for the Shanghai Stock Exchange, who also find that large auditors are associated with higher earnings response coefficients.

5. DISCUSSION AND CONCLUSIONS

Based on a variance decomposition framework using a sample of UK listed companies, this study examines the importance of accounting information in driving stock returns with particular emphasis on the relative role of accruals and cash flow and the importance of auditor type as a proxy for audit quality. Our results suggests some consistency with prior US based evidence (i.e., accruals and cash flow news are both important) yet there are some important differences. In particular, in general, and in contrast to early UK-based research, cash flows seem relatively more important than accruals in explaining stock returns. Our results might be seen as supportive of recent survey and behavioural research into the valuation models used by UK investors which finds that cash flow models have been gaining

influence over time relative to earnings-based models, perhaps as a result of scepticism over more subjective accruals (e.g. Imam et al., 2008) and/or due to the quality of cash flow reporting following on from FRS 1.

We also find that, in line with non-UK evidence based on standard regression approaches, auditor type may play an important role in moderating the relationships between stock returns and accounting information. In particular, variances of both cash flow news and accruals news are more influential drivers of returns for clients of large auditors. Since it is highly likely that the differences in our samples are partially attributable to different characteristics of the firms, as well as auditor effects, we also examine the relationships between cash flow and earnings and returns for similar sized firms. Although not as pronounced (suggesting that size plays an important role in the relationships we examine), our main conclusions remain: both cash and accruals components are larger for clients of large auditors than small auditors.

Several limitations are worth noting. First, the VAR approach restricts the choice of measure of auditor quality, since it requires stability over time in whichever measure is chosen. Nevertheless, our chosen classification has also been found to be a reliable (if somewhat crude) proxy for audit quality. Second, we are only able to provide evidence up to 2005 due to the change to IFRS in this year. It will there be of interest to examine how these relationships have changed as a result of the introduction of IFRS in general and IAS 7 in particular. Third, our sample is smaller than that of prior US-based research by Callen and Segal (2004), though this is partly due to us using data taken directly from the cash flow statement rather than the balance sheet. The effects of this might, however, be offset by the finding of Hribar and Collins (2002) that cash flow statement data are more reliable than balance sheet estimates.

Our study represents the first non-US research employing the variance decomposition approach to investigate the importance of accruals and cash flows in explaining variation in stock returns. Although there is research indicating that these apparently similar accounting regimes can produce marked differences in the accounting/market relationships (e.g. Pope and Walker, 1999), further research will be necessary to examine the extent to which these relationships are affected by international boundaries and by the respective accounting system/standards used to generate the earnings components.

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Table 1
Descriptive statistics

Panel A: Full sample (n = 3,646)

	Mean	Median	Std. dev.	Variance
Annual return	0.158	0.052	0.766	0.587
Log excess returns (r_t)	-0.047	0.000	0.518	0.268
Cash flow (cfe_t)	0.255	0.191	0.468	0.219
Accruals ($acce_t$)	-0.222	-0.159	0.366	0.134
Book/market ratio	0.816	0.649	0.637	0.406
Market value (£ million)	9,966	827	62,194	3.87×10^9

Panel B: Small auditor sample (n = 676)

	Mean	Median	Std. dev.	Variance
Annual return	0.211	0.076	1.016	1.031
Log excess returns (r_t)	-0.019	0.021	0.513	0.264
Cash flow (cfe_t)	0.154	0.131	0.376	0.142
Accruals ($acce_t$)	-0.155	-0.121	0.302	0.091
Book/market ratio	0.993	0.855	0.695	0.484
Market value (£ million)	616	231	1080	1,167,096

Panel C: Large auditor sample (n = 2,970)

	Mean	Median	Std. dev.	Variance
Annual return	0.146	0.048	0.696	0.485
Log excess returns (r_t)	-0.053	-0.003	0.519	0.269
Cash flow (cfe_t)	0.279	0.207	0.484	0.234
Accruals ($acce_t$)	-0.238	-0.168	0.377	0.142
Book/market ratio	0.776	0.606	0.617	0.380
Market value (£ million)	12,094	1,157	68733	4.72×10^9

Panel D: Size-matched large auditor sample (n = 676)

	Mean	Median	Std. dev.	Variance
Annual return	0.125	0.000	0.736	0.541
Log excess returns (r_t)	-0.088	-0.054	0.549	0.301
Cash flow (cfe_t)	0.218	0.158	0.421	0.177
Accruals ($acce_t$)	-0.239	-0.167	0.345	0.119
Book/market ratio	1.057	0.909	0.748	0.560
Market value (£ million)	617	231	1080	1,165,679

Notes
Data are for UK firms from 1996-2004 using *Datastream* (including dead company files) for returns data and *FAME* for accounting data.
Log excess returns are based on annual returns for the period ended three months after the year end less the risk free rate.
Cash flow is cash flow from operations (from the cash flow statement) scaled by opening book value.
Accruals are defined as profit minus cash flow from operations, scaled by opening book value.
Large auditor is a binary variable taking a value of 1 if the firm is audited by a big 5/big 4 auditor, 0 otherwise.
All variables are winsorised at the 1st and 99th percentiles.

Table 2
Variance decomposition results for total sample (n = 3,646)

Panel A: VAR coefficient matrix Γ

	r_{t-1}	cfe_{t-1}	$acce_{t-1}$	bm_{t-1}
r_t	0.009 (0.022)	0.075 (0.031)**	-0.003 (0.039)	0.103 (0.011)**
cfe_t	0.001 (0.016)	0.301 (0.040)**	0.062 (0.042)	-0.152 (0.016)**
$acce_t$	0.089 (0.014)**	0.002 (0.029)	0.179 (0.034)**	0.104 (0.012)**
bm_t	-0.151 (0.022)**	0.021 (0.048)	0.165 (0.062)**	0.726 (0.013)**

Panel B: Variance decomposition

Var(N_{total})	Var($N_{r,t}$)	Var($N_{cfe,t}$)	Var($N_{acce,t}$)	Diff($N_{cfe,t}$, $N_{acce,t}$)	Orthogonalised difference ($N_{cfe,t}$, $N_{acce,t}$)
0.309	0.032** (0.006)	0.549** (0.058)	0.256** (0.027)	0.292** (0.043)	0.231** (0.026)

$\frac{\text{Var}(N_{cfe})}{\text{Var}(N_{acce})}$	Cov($N_{r,t}$, $N_{cfe,t}$)	Cov($N_{r,t}$, $N_{acce,t}$)	Cov($N_{cfe,t}$, $N_{acce,t}$)
2.144	-0.061** (0.012)	0.039** (0.008)	-0.286** (0.037)

Notes
* significant at 5%; ** significant at 1%
Bootstrapped standard errors based on 10,000 iterations are in parentheses.
Data are for UK firms from 1996-2004 using *Datastream* (including dead company files) for returns data and *FAME* for accounting data.
Log excess returns r_t are based on annual returns for the period ended three months after the year end.
Cash flow cfe_t is cash flow from operations (from cash flow statement) scaled by opening book value.
Accruals $acce_t$ are defined as profit minus cash flow from operations scaled by opening book value.
bm_t is the log book to market ratio.

Table 3

Panel A: VAR Coefficient Estimates

	Small auditors (n = 676)				Large auditors (n = 2,970)				Size-matched large auditors (n = 676)			
	r_{t-1}	cfe_{t-1}	$acce_{t-1}$	bm_{t-1}	r_{t-1}	cfe_{t-1}	$acce_{t-1}$	bm_{t-1}	r_{t-1}	cfe_{t-1}	$acce_{t-1}$	bm_{t-1}
r_t	0.049	0.102	0.011	0.111**	0.002	0.063**	-0.013	0.100**	0.057	0.045	-0.064	0.124**
	(0.051)	(0.087)	(0.093)	(0.028)	(0.025)	(0.032)	(0.045)	(0.012)	(0.052)	(0.045)	(0.070)	(0.028)
cfe_t	0.015	0.409**	0.165	-0.047**	-0.001	0.234**	0.022	-0.183**	0.085**	0.182**	0.051	-0.121**
	(0.032)	(0.086)	(0.090)	(0.026)	(0.019)	(0.044)	(0.051)	(0.020)	(0.030)	(0.070)	(0.099)	(0.029)
$acce_t$	0.012	-0.001	0.094	0.042**	0.103	0.012	0.189**	0.119**	0.076**	-0.002	0.109	0.111**
	(0.028)	(0.063)	(0.073)	(0.021)	(0.016)**	(0.031)	(0.039)	(0.014)	(0.027)	(0.056)	(0.076)	(0.023)
bm_t	-0.167**	-0.173	-0.042	0.717**	-0.150	0.063	0.223**	0.728**	-0.232**	0.032	0.133	0.715**
	(0.059)	(0.162)	(0.184)	(0.034)	(0.024)**	(0.036)	(0.049)	(0.013)	(0.047)	(0.058)	(0.088)	(0.035)

Panel B: Variance Decomposition

	$\text{Var}(N_{total})$	$\text{Var}(N_r)$	$\text{Var}(N_{cfe})$	$\text{Var}(N_{acce})$	$\text{Var}(N_{total})$	$\text{Var}(N_r)$	$\text{Var}(N_{cfe})$	$\text{Var}(N_{acce})$	$\text{Var}(N_{total})$	$\text{Var}(N_r)$	$\text{Var}(N_{cfe})$	$\text{Var}(N_{acce})$
	0.247	0.041	0.273**	0.105**	0.312	0.030**	0.616**	0.306**	0.259	0.049**	0.343**	0.203**
		(0.022)	(0.075)	(0.020)		(0.007)	(0.074)	(0.037)		(0.022)	(0.081)	(0.046)
	$\frac{\text{Var}(N_{cfe})}{\text{Var}(N_{acce})}$	$\text{Diff}(N_{cfe}, N_{acce})$		Orthogonalised difference (N_{cfe}, N_{acce})	$\frac{\text{Var}(N_{cfe})}{\text{Var}(N_{acce})}$	$\text{Diff}(N_{cfe}, N_{acce})$		Orthogonalised difference (N_{cfe}, N_{acce})	$\frac{\text{Var}(N_{cfe})}{\text{Var}(N_{acce})}$	$\text{Diff}(N_{cfe}, N_{acce})$		Orthogonalised difference (N_{cfe}, N_{acce})
	2.600	0.168**		0.151**	2.01	0.310**		0.234**	1.69	0.140**		0.160**
		(0.072)		(0.056)		(0.051)		(0.030)		(0.055)		(0.042)
	$\text{Cov}(N_r, N_{cfe})$	$\text{Cov}(N_r, N_{acce})$	$\text{Cov}(N_{cfe}, N_{acce})$		$\text{Cov}(N_r, N_{cfe})$	$\text{Cov}(N_r, N_{acce})$	$\text{Cov}(N_{cfe}, N_{acce})$		$\text{Cov}(N_r, N_{cfe})$	$\text{Cov}(N_r, N_{acce})$	$\text{Cov}(N_{cfe}, N_{acce})$	
	-0.015	0.016	-0.085**		-0.069**	0.042**	-0.347**		-0.068*	0.047**	-0.189**	
	(0.032)	(0.015)	(0.031)		(0.014)	(0.010)	(0.050)		(0.027)	(0.021)	(0.060)	

Notes

* significant at 5%; ** significant at 1%

Bootstrapped standard errors are in parentheses.

Data are for UK firms from 1996-2004 using *Datastream* (including dead company files) for returns data and *FAME* for accounting data.

Log excess returns r_t are based on annual returns for the period ended three months after the year end.

Cash flow cfe_t is cash flow from operations (from cash flow statement) scaled by opening book value.

Accruals $acce_t$ are defined as profit minus cash flow from operations scaled by opening book value.

bm_t is the log of the book to market ratio.