

The Persistence of the Accruals Anomaly*

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Abstract

The accruals anomaly — the negative relationship between accounting accruals and subsequent stock returns — has been well documented in the academic and practitioner literatures for almost a decade. To the extent that this anomaly represents market inefficiency, one would expect sophisticated investors to learn about it and arbitrage the anomaly away. We show that the accruals anomaly still persists and, even more strikingly, its magnitude has not declined over time. How can this be explained? We show that the accruals anomaly is recognized and, indeed, exploited by certain active institutional investors, but the magnitude of this accruals-related trading is rather small. By and large, institutions shy away from extreme accruals firms because their attributes, such as small size, low profitability, and high risk stand in stark contrast to those preferred by most institutions. Individual investors are also, by and large, unable to profit from trading on accruals information due to the high information and transaction costs associated with implementing a consistently profitable accruals strategy. Consequently, the accruals anomaly persists and will probably endure.

Keywords Accruals; Information costs; Institutional investors; Market efficiency; Transaction costs

JEL Descriptors G11, G14, M4

La persistance de l'anomalie des ajustements comptables

Condensé

Les travaux précurseurs de Sloan sur l'anomalie des ajustements comptables — soit le rapport négatif entre les ajustements comptables (le composant hors trésorerie des résultats) et les rendements subséquents des actions — ont engendré énormément de recherches. Les ajustements comptables précis auxquels est attribuable l'essentiel de cette anomalie (au premier chef, ceux qui se rapportent aux stocks) ont été définis, et les relations entre l'anomalie des ajustements comptables et d'autres phénomènes inattendus, comme la persistance des mouvements consécutifs à la publication des résultats, ont été analysées. Ces études ont fait l'objet

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d'une large diffusion chez les chercheurs et les praticiens et, comme on pouvait le prévoir, il a été démontré que les investisseurs institutionnels réagissaient à l'information relative aux ajustements comptables. Compte tenu de la stratégie apparemment simple d'exploitation de l'anomalie des ajustements comptables — soit l'adoption d'une position longue à l'égard des sociétés dont les ajustements comptables sont réduits et d'une position courte à l'égard de celles dont les ajustements comptables sont élevés —, l'on pourrait croire que les investisseurs avertis et clairvoyants feront en sorte que l'anomalie se dissipe rapidement et en vienne à se résorber.

Or, étonnamment, il n'en est rien. Les auteurs montrent que non seulement l'anomalie persiste, mais que son ampleur ne diminue pas au fil du temps. Cette constatation donne à penser que la réaction des investisseurs aux ajustements comptables est soit inopportune, soit insuffisante pour qu'ils tirent profit de l'anticipation des fluctuations des cours à venir grâce à l'information contenue dans les ajustements comptables. Les auteurs s'inspirent donc les travaux réalisés sur la persistance de l'anomalie en examinant à la fois l'à-propos et l'ampleur de la réaction des investisseurs institutionnels à l'information relative aux ajustements comptables. Étant donné que l'intensité des activités de négociation des investisseurs institutionnels suscitée par l'information fondamentale varie, les auteurs établissent la distinction entre les institutions qui négocient activement dans le but de profiter de la fluctuation des cours à court terme (« institutions opportunistes ») et l'ensemble des autres institutions (« institutions non opportunistes »).

En analysant la fluctuation trimestrielle des avoirs institutionnels, les auteurs observent l'existence d'une relation négative entre le niveau des ajustements comptables dans un exercice donné et la fluctuation des avoirs des institutions opportunistes dans le dernier trimestre de l'exercice en question ainsi que dans chacun des trois trimestres suivants. La stratégie d'investissement des institutions opportunistes serait donc liée à l'information relative aux ajustements comptables, une partie de cette stratégie étant, semble-t-il, régie par l'information contenue dans les rapports trimestriels de l'exercice faisant l'objet des ajustements comptables et l'autre partie étant régie par l'information relative aux ajustements comptables publiée annuellement. L'intensité des activités d'investissement liées à l'information relative aux ajustements comptables est plus grande dans le premier trimestre de l'exercice subséquent et diminue par la suite. Fait intéressant, la situation n'était pas la même dans les années 1980 : la réaction institutionnelle à l'information relative aux ajustements comptables était plus modérée que dans les années 1990, mais elle se maintenait durant les trimestres de l'exercice subséquent. Il semble donc que les institutions opportunistes aient raffiné avec le temps leurs activités de négociation liées à l'information relative aux ajustements comptables. En revanche, les activités de négociation des institutions non opportunistes liées à l'information relative à ces ajustements étaient inexistantes dans les années 1980 et se concentraient dans le premier trimestre de l'exercice postérieur à l'exercice faisant l'objet desdits ajustements au cours des années 1990.

Pour approfondir la question de savoir si, dans leurs activités de négociation, les institutions réagissent à l'information relative aux ajustements comptables ou simplement aux fluctuations subséquentes du cours des actions, documentées par Sloan (1996), les auteurs comparent les rendements mensuels des actions durant et après l'exercice faisant l'objet des ajustements comptables avec les fluctuations des avoirs institutionnels. Cette analyse révèle clairement que certaines institutions *infléchissent* le profil de rendement des

actions associé aux ajustements comptables. Les auteurs enrichissent donc les travaux existants en démontrant que les institutions réagissent activement et rapidement à l'information relative aux ajustements comptables.

Les auteurs se demandent ensuite pourquoi le fait que l'information relative aux ajustements comptables incite les institutions opportunistes à négocier activement n'entraîne pas la disparition de l'anomalie des ajustements comptables. Ils répondent à cette question en montrant que la variation de la valeur monétaire des avoirs institutionnels liée aux ajustements comptables est sensiblement inférieure à 10 % de la variation trimestrielle absolue moyenne des avoirs institutionnels. Ces activités de négociation relativement modérées semblent insuffisantes pour exercer une influence sensible sur l'anomalie des ajustements comptables. Une autre question se pose donc : pourquoi les institutions ne réagissent-elles pas à l'information relative aux ajustements comptables par des activités de négociation plus vigoureuses, compte tenu des gains potentiels d'une telle stratégie ? Les auteurs répondent à cette question en déterminant empiriquement deux profils : celui des sociétés présentant des ajustements comptables extrêmes et celui des sociétés dans lesquelles les investisseurs institutionnels tendent à investir. En comparant ces profils, les auteurs constatent que les sociétés présentant des ajustements comptables extrêmes possèdent certaines caractéristiques — taille modeste, faible cours des actions et faible ratio valeur comptable/cours, notamment — que les institutions s'efforcent d'éviter. Les différences importantes et systématiques entre les deux profils donnent à penser que la faible réaction des institutions à l'information relative aux ajustements comptables est au moins en partie expliquée par le caractère dissuasif des caractéristiques des sociétés présentant des ajustements comptables extrêmes, que les investisseurs institutionnels évitent en général en raison de ce que leur dictent les règles de prudence, de leurs préoccupations relatives à la liquidité et d'autres considérations.

Si les institutions sont soumises à des restrictions dans leur réaction aux gains pouvant résulter des ajustements comptables, pourquoi les particuliers investisseurs n'y cherchent-ils pas leur compte et n'exploitent-ils pas l'anomalie ? Les auteurs montrent que la négociation des actions d'entreprises présentant des ajustements comptables extrêmes impose aux particuliers des coûts élevés de traitement de l'information et d'opération susceptibles de les dissuader d'exploiter les gains associés aux ajustements comptables. En recourant à la simulation, ils démontrent que pour pouvoir tirer des gains soutenus (avant les coûts de traitement de l'information et d'opération) d'une stratégie axée sur les ajustements comptables, les investisseurs doivent posséder des portefeuilles regroupant une quantité de titres relativement grande. Étant donné que les coûts de traitement de l'information augmentent avec le nombre de titres détenus et négociés par les particuliers (qui doivent, par exemple, calculer périodiquement les ajustements comptables de centaines de sociétés, afin de déterminer quelles sont les 40 à 50 sociétés ayant des ajustements comptables extrêmes qui présentent un intérêt, et verser d'importantes commissions, en partie fixes, pour chaque opération), cette stratégie axée sur les ajustements comptables est impraticable pour la plupart des particuliers investisseurs. De plus, le fait que la majorité des gains potentiels tirés d'une stratégie axée sur les ajustements comptables proviennent des *ventes à découvert* de titres de sociétés présentant des ajustements comptables élevés — une forme de négociation très onéreuse pour les particuliers — freine encore davantage les velléités d'exploitation de l'anomalie des ajustements comptables des particuliers investisseurs.

Les constatations des auteurs laissent donc croire que divers facteurs d'ordre structurel et liés aux coûts font obstacle à l'exploitation judicieuse de l'anomalie des ajustements comptables et qu'il est peu probable que ces facteurs disparaissent dans un avenir prévisible. Certes, un autre facteur important influe sur l'anomalie des ajustements comptables : les manipulations de résultats auxquelles se livrent les dirigeants en altérant l'estimation des ajustements comptables. Bien que les auteurs n'abordent pas cette question dans leur étude, les variations de l'étendue de la manipulation des résultats dans le temps auront une incidence certaine sur l'ampleur et la persistance du phénomène des ajustements comptables.

1. Introduction

Sloan's 1996 pioneering documentation of the accruals anomaly — the negative association between accounting accruals (the noncash component of earnings) and subsequent stock returns — spawned considerable research. Specific accruals that are mostly responsible for the anomaly (primarily inventories) were identified, and the relationships between the accruals anomaly and other unexpected phenomena, such as the post-earnings announcement drift, have been investigated. These studies were widely disseminated among researchers and practitioners and, as expected, institutional investors have been shown to react to accruals information (Collins, Gong, and Hribar 2003). These investors tend to hold relatively large positions in low-accruals companies, and small positions in high-accruals companies. Given the seemingly simple exploitation strategy of the accruals anomaly — investing long in low-accruals companies and shorting high-accruals companies — one would expect that sophisticated investors will cause the anomaly to quickly dissipate and ultimately vanish.

Surprisingly, this did not happen. Collins et al. (2003) and Bushee and Raedy (2003) document the continuation of the accruals anomaly, and we show not only that the anomaly persists, but that its magnitude has not diminished over time. This suggests that investors' response to accruals is either untimely or insufficient to effectively arbitrage the information in accruals about future price changes. We accordingly follow the documentation of the anomaly's persistence by examining both the timeliness and magnitude of institutional investors' reaction to accruals information.

Collins et al. (2003) examine institutions' reactions to accruals and report that the annual change in institutional ownership is negatively related to the level of accruals in the previous year, which suggests that institutions do react to accruals information. However, because most of the abnormal returns associated with accruals are earned in the following year (Sloan 1996), and these returns start to accrue early, soon after the annual earnings announcement date (Collins and Hribar 2000), it is not clear from an examination of annual changes in institutional holdings whether institutions react to the release of accruals information on a timely basis or, rather, trade in extreme-accruals firms following their price changes.¹ Indeed, Collins et al. (2003, 275) note: "since we are using annual institutional holding data, results from this section should be interpreted cautiously". Given that the timeliness of institutional response to accruals information is an important issue both for assessing market efficiency and explaining the persistence

of the accruals anomaly, we examine institutional reaction to accruals using quarterly institutional ownership data compared with monthly return patterns. Because institutional investors differ in their intensity of trade on fundamental information, we follow Collins et al. and distinguish between institutions that trade frequently in an attempt to profit from short-term price changes (“transient institutions”) and all other institutions (“nontransient institutions”). We thus extend available evidence on institutional response to accruals by focusing sharply on the question, “Does institutional trading lead or lag the accruals-related price changes?”

Analyzing the quarterly change in institutional ownership, we document a negative relation between the level of accruals in a given year and the change in ownership by transient institutions during the last quarter of that year as well as in each of the subsequent three quarters. Thus, the investment of transient institutions is related to accruals information: a certain portion of this investment is apparently driven by quarterly report information in the accruals year, and the rest is related to the release of the annual accruals information. The intensity of the accruals-related investment is strongest in the first quarter of the following year, and decreases thereafter. Interestingly, this was not the case during the 1980s: institutional reaction to accruals, though weaker than in the 1990s, was similar across the quarters of the subsequent year. Thus, it appears that transient institutions enhanced over time the sophistication of their trading on accruals information. The accruals-related investment by nontransient institutions was, in contrast, nonexistent in the 1980s, and concentrated in the first quarter of the following year during the 1990s.

To probe deeper into the question whether institutions trade on accruals information or just react to the subsequent stock price changes documented by Sloan 1996, we compare monthly stock returns during and after the accruals year with changes in institutional ownership. This analysis clearly indicates that certain institutions lead the pattern of stock returns associated with accruals. We thus contribute to the literature by establishing that institutions do actively and expeditiously trade on the information in accruals.

We then ask, “Why isn’t the accruals anomaly abating if transient institutions trade actively on accruals?” We address this question by showing that the accruals-related change in institutional ownership amounts to substantially less than 10 percent of the mean quarterly absolute change in institutional ownership. This relatively light trade seems insufficient to materially affect the accruals anomaly, which then begs the question, “Why aren’t institutions trading more vigorously on accruals information, given the potential gains from such a strategy (documented by Bushee and Raedy 2003)?” We address this question by empirically identifying two profiles: that of firms with extreme accruals, and that of companies that institutional investors tend to invest in. Comparing these profiles we find that extreme-accruals firms have characteristics, such as small size and low stock price and book-to-market ratio, that institutions tend to avoid. The significant and systematic differences between the two profiles suggest that the weak response of institutions to accruals is at least partially explained by the unattractive characteristics of extreme-accruals firms, which institutional investors by and large avoid due to prudent-man laws (described below), liquidity concerns, and other considerations.²

If institutions are restrained in their response to the potential gains of accruals, why do individual investors not enter the fray and exploit the anomaly? We show that trading in the stocks of extreme-accruals firms entails substantial information processing and transaction costs for individuals, likely deterring them from exploiting the accruals' gains. Using simulation, we show that in order to consistently generate gains (before information and transaction costs) from an accruals strategy, the portfolios employed have to consist of a relatively large number of securities. Because individuals' information-processing and transaction costs increase with the number of securities traded (one has, for example, to calculate accruals periodically for hundreds of firms to identify 40–50 extreme-accruals candidates, and pay substantial commissions, which include a fixed per-transaction component), such an accruals-based strategy is impracticable for most individual investors. Moreover, the fact that most of the potential gains from an accruals strategy come from the short sales of high-accruals companies — a very expensive trade for individuals — further inhibits individuals from exploiting the accruals anomaly.

Our findings, therefore, suggest that arbitraging away the accruals anomaly is hindered by various structural and cost factors, which are unlikely to disappear in the foreseeable future. There is, of course, another important factor affecting the accruals anomaly: managers' earnings manipulation activities by means of the misestimation of accruals. Although this factor is not examined here, temporal changes in the extent of earnings manipulation will obviously affect the size and persistence of the accruals phenomenon.

In a concurrent study, Bushee and Raedy (2003) examine the profitability of seven stock-trading strategies, including the accruals anomaly. They compute the abnormal returns earned by each strategy after deducting estimates of transaction costs and report that the accruals strategy still generates positive abnormal returns. A unique and interesting feature of their study is the explicit consideration of several sources of transaction costs, including the price pressure of trading. Our evidence provides, in our opinion, a complementary perspective on the accruals anomaly: the existence of potential after-transaction-costs gains from accruals (Bushee and Raedy) does not preclude other systematic factors, such as prudent-man laws and liquidity concerns, from strongly deterring institutional investors from investing in extreme-accruals firms. Stated differently, the potential gains from an accruals strategy have to be weighed by institutions against the potential risk of investing in firms that will expose them to investor litigation or losses related to illiquidity. Regarding individual investors, the substantial information-processing costs (generally not considered a transaction cost) involved in the relatively large portfolios that are needed (as we document) to exploit the accruals gains likely preclude most individuals from trading on accruals. The fact is that, despite the demonstrated profitability of the accruals strategy, the extent of the anomaly is not abating, as we show in the next section. Evidently, systematic structural factors prevent many investors, both institutions and individuals, from trading on accruals despite the apparent profitability of such trade. An important contribution of this study is to shed light on these structural factors.

The remainder of the paper is organized as follows. Section 2 presents the 38-year record of the accruals anomaly and documents that its size (pre-information and transaction cost returns to an accruals strategy) did not diminish over time. Section 3 examines the quarterly reaction of institutional investors, both transient and nontransient, to accruals information, and section 4 establishes that institutions lead stock prices in trading on accruals. Section 5 quantifies the weak response of institutions to accruals information and identifies the reasons for the timid response. Section 6 examines the impediments to individual investors' exploitation of the accruals anomaly, and section 7 concludes the paper.

2. The accruals anomaly over time

Researchers have shown that the accruals anomaly persists to the present (e.g., Collins et al. 2003; Bushee and Raedy 2003; Mashruwala et al. 2004). We open our analysis by examining whether the extent of the anomaly is declining (a phenomenon may persist, yet decline in magnitude), as one would expect from the documented potential gains from trading on accruals. This is an important question because if, despite the increasing recognition of the accruals anomaly among academics and practitioners, its magnitude is not declining, there must be systematic impediments to trade on accruals, and identifying these impediments will further our understanding of both capital-market efficiency and the implications of accounting procedures, such as accruals, for users of financial information.

To construct the sample for this examination, we merge the COMPUSTAT industrial, full coverage, and research files with the Center for Research in Securities Prices (CRSP) monthly files, and extract the accounting and market information required to measure accruals and abnormal returns (discussed below). Because the institutional holding data used in the primary analysis are available only for the end-of-calendar quarters, we restrict the sample to firm-year observations with December fiscal year-end.³ We follow prior studies and exclude from the sample financial services firms (two-digit Standard Industrial Classification [SIC] codes 60–69), because the nature of their accruals is substantially different from that of nonfinancial firms. Our sample period spans the accruals years 1965–2002, with stock returns ranging from May 1966 through December 2003 (as discussed below, stock returns are measured for the 12 months that start in May of the year following the accruals).⁴

Following previous studies, we use two measures of accruals: the change in successive balance sheet accounts (*BS_ACC*), and the difference between net income and reported cash from operations (*CFS_ACC*). The balance-sheet-based measure of accruals is calculated as in Sloan 1996:

$$BS_ACC = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta ITP) - Dep \quad (1),$$

where

ΔCA = annual change in current assets (change in COMPUSTAT data item #4 — that is, $\Delta\#4$);

$\Delta Cash$ = change in cash and cash equivalents ($\Delta\#1$);

ΔCL = change in current liabilities ($\Delta\#5$);

ΔSTD = change in debt included in current liabilities ($\Delta\#34$);

ΔITP = change in income taxes payable ($\Delta\#71$); and

Dep = annual depreciation and amortization expense ($\#14$).⁵

The second measure of accruals, based on information from the cash flow statement, is calculated as:

$$CFS_ACC = EBXI - CFO \quad (2),$$

where

$EBXI$ = earnings before extraordinary items and discontinued operations ($\#123$),
and

CFO = net cash flow from operating activities ($\#308$).

Collins and Hribar (2002) report that the balance sheet approach to measuring accruals introduces measurement error into the accruals estimate, primarily due to mergers and acquisitions and discontinued operations. The cash-flow-based measure of accruals is not affected by such corporate events, but is available only from 1988. We therefore use both measures in our analyses. To account for size differences across the sample firms, we scale (divide) the accruals by the average of the beginning and end-of-year book value of total assets ($\#6$).

We estimate abnormal (risk-adjusted) stock return as the difference between the firm's one-year holding-period return and the corresponding return on a matched portfolio based on size (five quintiles) and book to market (five quintiles for each size quintile). Abnormal returns are measured from May of the year following the accruals to assure that investors had access to the accruals information we examine. For securities that delisted during the holding period, delisting proceeds are invested in the New York Stock Exchange (NYSE), the American Stock Exchange (AMEX), and the NASDAQ value-weighted index until the end of the holding period. All of our results are qualitatively similar when we use size-adjusted returns, or the residual return from a cross-sectional regression of the firm's annual stock return on market beta, size, book-to-market, and the prior-year return (momentum), rather than the size and book-to-market adjusted returns used in the primary analysis. We also obtain similar results when 100 benchmark size and book-to-market portfolios (10 book-to-market portfolios for each size decile) are used instead of the 25 portfolios in the primary analysis.

To examine whether the magnitude of the accruals anomaly has changed over time, we conduct the following analysis. For each year (1965–2002), we construct a zero-investment portfolio that takes a long position in the stocks of firms in the lowest decile of accruals (scaled by average total assets) and an equal size short

position in the stocks of firms in the highest decile of accruals. We then calculate the mean abnormal return of this zero-investment portfolio in the subsequent 12 months (beginning on May 1). Figure 1 presents the abnormal returns in each of the 38 sample years for three such zero-investment portfolios, which differ with respect to the sample from which the extreme-accruals firms were selected and the approach used to calculate accruals: (1) NYSE and AMEX firms, with accruals measured from the balance sheet (*BS_ACC*); (2) all sample firms, with accruals measured from the balance sheet; and (3) all firms, with accruals measured from the cash flow statement (*CFS_ACC*). We run the analysis for NYSE and AMEX firms (first portfolio) to assure that the return patterns we identify are not affected by the addition of the numerous NASDAQ firms since the 1970s. For the cash-flow-based accruals, we report results using all firms only because this measure is available since 1988 (that is, after the introduction of NASDAQ firms).

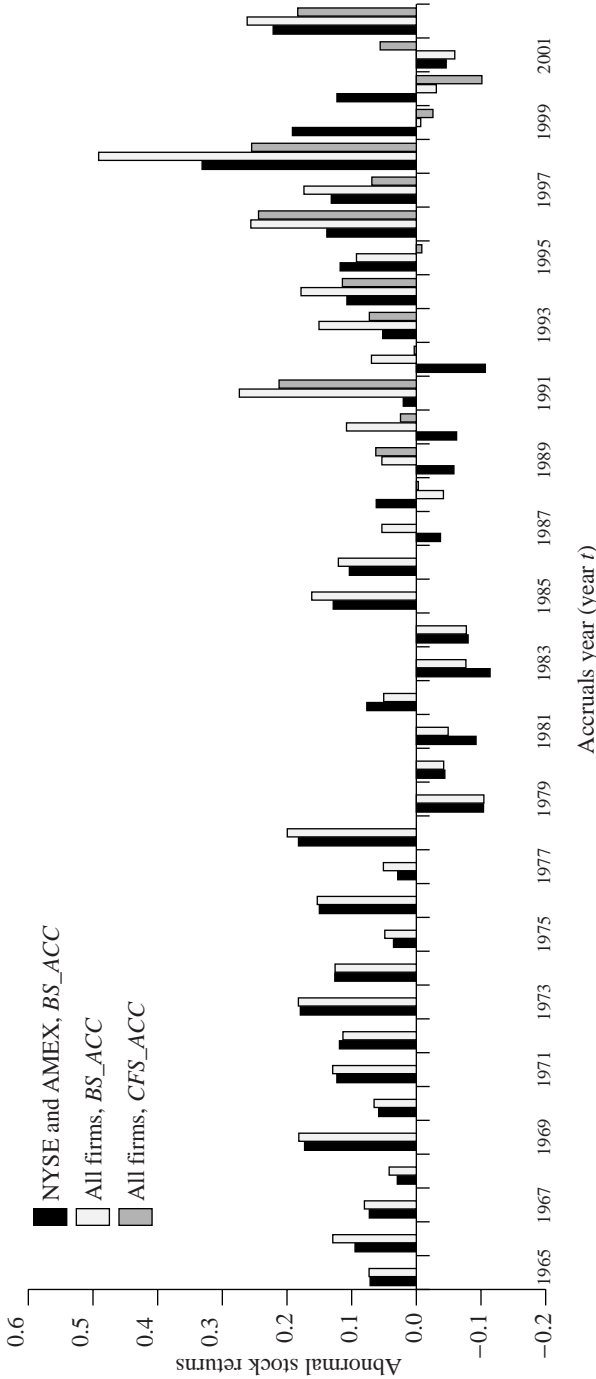
Figure 1 indicates that, for each of the three portfolios examined, the accruals strategy generated positive and economically significant abnormal returns in most years. The pattern of abnormal returns does not exhibit clear trends over time. Surprisingly, some of the returns in the late 1990s and in 2003 (that is, accruals year 2002), a period during which the accruals anomaly was widely discussed in academic and practitioners' circles, are larger than previous years' returns. To detect nonvisible trends in the zero-investment portfolios' abnormal returns we run the following time-series regression:

$$PORT_AR = \beta_1 + \beta_2 TREND + \varepsilon \quad (3),$$

where *PORT_AR* is the annual zero-investment portfolio abnormal return, and $TREND = 0.001 \times (\text{year} - \text{mean year})$. Note that because *TREND* has a zero mean, the regression intercept (β_1) reflects the time-series mean of the portfolio abnormal return. Table 1 reports the estimates of (3) for the zero-investment portfolio as well as for its low- and high-accruals portions, for the three samples described above. The mean annual abnormal returns of the zero-investment portfolio (bottom pair of rows), as measured by the regression intercept, are positive and highly significant in each of the three columns, ranging between 6.6 percent and 9.4 percent.⁶ Consistent with the visual absence of trends in Figure 1, the coefficient of the *TREND* variable is insignificant in each of the three regressions, indicating that the magnitude of the accruals anomaly has not changed significantly over time. Moreover, examination of the long and short accruals positions individually (low and high accruals, respectively), presented in the top two pairs of rows in Table 1, indicates that there is no apparent trend in the returns of either side of the zero-investment strategy. Clearly, most of the zero-investment portfolio returns come from shorting the high-accruals firms (we return to this finding in section 6).

We thus conclude not only that the accruals anomaly persists, but that its magnitude has not abated over time. This finding is surprising, given that institutional investors appear to be cognizant of and trade on accruals information (Collins et al. 2003), and that their share in capital markets has steadily increased over the sample period (Gompers and Metrick 2001). This suggests that the institutional response

Figure 1 The accruals anomaly over time



Note:

The figure reports the time series of abnormal zero-investment portfolio returns for three sets of sample/accruals measure. Each portfolio consists of long positions in low-accruals firms (lowest decile) and short positions in high-accruals firms (highest decile). Abnormal return is measured as the difference between the firm's return and the contemporaneous return on a matched portfolio based on size (five quintiles) and book-to-market (five quintiles for each size quintile). Returns are measured from May 1 of year $t + 1$ (following the accruals) through April 30 of the following year. *BS_ACC* (*CFS_ACC*) is a measure of accruals using information from the balance sheet (cash flow statement).

to accruals information is either untimely or rather timid, incapable of arbitraging away the gains from the accruals strategy. We explore these conjectures below.

3. The reaction of institutional investors to accruals information

In this section we document that quarterly changes in institutional holdings are related to the accruals anomaly. Institutions tend to increase holdings in low-accruals firms and decrease holdings in high-accruals firms. Furthermore, we show that for transient (active) institutions, this trading starts in the fourth quarter of the accruals year and is most pronounced in the following quarter. Nontransient institutions react to accruals in the first quarter of the following year.

Our research design for documenting the accruals-related institutional trading involves regressing cross-sectionally the quarterly changes in institutional ownership on accruals and various control variables. The magnitude, sign, and significance of

TABLE 1
Time-series regressions of portfolio abnormal returns on an intercept and time trend

$$PORT_AR = \beta_1 + \beta_2 TREND + \epsilon \tag{3}$$

	NYSE and AMEX firms, balance sheet approach (1965–2002)		All firms, balance sheet approach (1965–2002)		All firms, cash flow statement approach (1988–2002)	
	Intercept	TREND	Intercept	TREND	Intercept	TREND
Low accruals	0.018 1.5	0.138 0.1	0.031 2.1	1.206 0.9	0.020 0.8	5.396 0.9
High accruals	-0.048 -3.3	-0.500 -0.4	-0.063 -6.0	-0.312 -0.3	-0.057 -4.1	3.397 1.0
Low-high	0.066 3.9	0.638 0.4	0.094 4.9	1.518 0.9	0.077 2.7	2.000 0.3

Note:

For each regression, the first row reports the coefficients while the second row reports the *t*-statistics. *PORT_AR* is the portfolio annual abnormal return (that is, the equally weighted average of the abnormal stock returns across the portfolio securities). Abnormal stock return is measured as the difference between the firm’s return and the contemporaneous return on a matched portfolio based on size (five quintiles) and book-to-market (five quintiles for each size quintile). Returns are measured over a 12-month period starting in May of the following year. *TREND* is normalized to have a zero mean, so the intercept measures the time-series mean of the portfolio abnormal returns. The low (high) portfolio consists of equal-size positions in the firms in the lowest (highest) accruals decile each year. Two measures of accruals are used, one based on changes in balance sheet accounts, and the other on information from the cash flow statement. In both cases, accruals are deflated by average total assets during the year.

the estimated accruals coefficients are used to infer the extent and timeliness of institutions' reaction to accruals information, as well as the patterns over time and across types of institutions in the reaction to accruals. To construct the sample for this analysis, we supplement the data used in the stock return analysis (section 2) with additional accounting and market information from COMPUSTAT and CRSP (discussed below), and merge these data with institutional 13(f) common stock holding information derived from Thomson Financial Securities Data. Due to limited availability of institutional ownership data, our sample period for this analysis covers the accruals years 1982 through 2001.

The dependent variable in the institutional response regressions (model 4, presented below), $\Delta IO(q, g)$, measures the change during quarter q in the percentage of the firm's outstanding shares held by institutions of the type g (transient or non-transient institutions). We report regression estimates where q refers to the third and fourth quarters of the accruals year, as well as when q refers to the first, second, and third quarters of the subsequent year. The change in institutional ownership in the last two quarters of the accruals year is examined because some information about annual accruals might be predicted from current-year quarterly reports, and institutions may therefore trade in anticipation of the annual accruals information. However, we expect the strongest institutional reaction to take place in the first quarter of the subsequent year, because most firms report their annual earnings and accruals during that quarter. Some institutions may also trade on accruals information during the second and perhaps even the third quarter of the subsequent year, either because certain firms disclose complete accruals information after March 31, or because of investors' delays in implementing a successful accruals strategy (for example, lags in obtaining the needed information on the level of accruals for benchmark firms, or investing gradually — stealth investing — to reduce the price impact of trading).⁷

Institutional investors differ in their intensity of trading on fundamental information, such as the accounting accruals examined here. Bushee (1998) classifies institutional investors into three trading-intensity groups: institutions that buy securities and hold for the long haul, institutions that follow indexing strategies, and institutions that trade frequently in an attempt to profit from short-term price changes (transient institutions).⁸ To the extent that accruals proxy for earnings quality (persistence) and offer profit opportunities, transient institutions are most likely to trade promptly on accruals. We accordingly examine the response to accruals of transient and nontransient institutions (the former two types) separately.⁹ Institutional ownership is measured as the fraction of the firm's shares outstanding held by "large" institutional investors (institutions with more than \$100 million of securities under discretionary management, which are subject to the 13(f) reporting requirements).

The explanatory (independent) variable of focus in the institutional reaction regressions (4), below, is the size of the firm's accruals component of earnings, scaled by average total assets. We use the balance-sheet-based measure of accruals (BS_ACC) described above, which is available for all sample years. For the more recent years (1988–2001), we report the sensitivity of the results when accruals

are based on information from the cash flow statement (*CFS_ACC*). To mitigate concerns with model specification issues (for example, nonlinearity of the relationships, non-normality of the distribution of accruals), we replace the actual values of *BS_ACC* and *CFS_ACC* with their respective cross-sectional ranks, scaled by the number of cross-sectional observations.¹⁰

We next present the control variables in the regression of the quarterly change in institutional ownership on accruals (model 4). Various studies have demonstrated that institutional investors tend to hold a relatively sizable investment in large firms (e.g., O'Brien and Bhushan 1990; Cready 1994; Hessel and Norman 1992; Potter 1992). This is attributed primarily to concerns of institutions with prudent-man standards (investment in large companies is generally considered safe), and to the preference of institutional investors for stocks with high levels of information and liquidity. We accordingly control for firm size (*SIZE*) in the regressions, measured by the logarithm of the market value of common equity at the end of the accruals year.

We use three additional proxies for the prudence of institutional investment and availability of information about companies: firm age (*AGE*, the number of years since the start of coverage by CRSP), return on assets (*ROA*), and financial leverage (*LEV*). These controls were used in prior institutional investor studies (e.g., Cready 1994; Del Guercio 1996; Bushee 2001). *ROA* is measured as operating income divided by the yearly average of total assets, and serves as a proxy for the safety of investment (profitable firms are less likely to fail). *ROA* also controls for the information in accruals (*BS_ACC*) about the level of earnings (accruals are a component of earnings, along with cash flows). Leverage, *LEV*, a proxy for financial risk, is measured as the ratio of the book value of debt to the sum of the book value of debt and the market value of equity at the end of the year.

Because institutions trade more frequently than individual investors and hold larger equity positions, they generally show an aversion to stocks with high transaction costs and low liquidity (e.g., Falkenstein 1996; Gompers and Metrick 2001). In addition to firm size, two commonly used proxies for transaction costs and liquidity are share price and turnover (both are negatively related to transaction costs and positively related to liquidity). We use these variables as controls and define *LOGP* as the log of the firm's share price at the end of the year, and turnover (*TURN*) as the logarithm of the annual average ratio of the stock's monthly trading volume to total shares outstanding.

Institutional investors tend to avoid shares with high idiosyncratic volatility (e.g., Shleifer and Vishny 1997; Bushee 2001), yet were found to invest in high beta stocks (e.g., O'Brien and Bhushan 1990) and follow momentum strategies (e.g., Grinblatt et al. 1995). Accordingly, we control in (4) for *BETA*, *ALPHA*, and *VOLAT*, where *BETA* (*ALPHA*) is the market-model slope (intercept) and *VOLAT* is the residual standard error from the market-model regression, which is estimated using all available daily returns during the accruals year and the value-weighted market index.¹¹ We further control for the book-to-market ratio (*BM*), because many institutional investors follow either "value" or "growth" strategies, which induce a (positive or negative) correlation between institutional holdings and the

book-to-market ratio (e.g., Gompers and Metrick 2001). We also control for the dividend yield (*YIELD*), because institutional investors generally prefer stocks with low dividend yield and high capital gains (e.g., Cready 1994; Del Guercio 1996; Gompers and Metrick).

To mitigate potential bias due to omission of correlated variables, we control for the level of ownership by institutions at the end of the previous quarter ($IO(q - 1, g)$). In addition to capturing the effect of omitted variables, $IO(q - 1, g)$ may itself affect the subsequent change in institutional ownership, given that Bushee and Noe (2000) report that institutional ownership is mean reverting.

Finally, a note on the above control variables. Some of the sources we quote relate the control variables to the level of institutional holding, while our dependent variable in (4) is the quarterly change in ownership. Other studies (e.g., Cready 1994; Hotchkiss and Strickland 2003), however, use several of these variables as controls for the change in institutional ownership. There is no clear-cut distinction in the literature between the controls for the level and change of ownership. Thus, for example, Hotchkiss and Strickland 2003 (Tables VI and VII) include in their regressions of ownership change the following control variables: price-to-earnings (P/E) ratio, firm size, market-to-book ratio, sales growth, and dividend yield, most of which are included in (4). Indeed, when we regress both the level and change of institutional ownership on the control variables (Table 5 below), most of the controls are significant in both the level and change regressions.¹²

The primary regression model that includes all of the control variables described above, along with our variable of interest — accounting accruals (*BS_ACC*) — is

$$\begin{aligned} \Delta IO(q, g) = & \alpha_{industry} + \beta BS_ACC + \gamma_1 SIZE + \gamma_2 AGE + \gamma_3 ROA + \gamma_4 LOGP \\ & + \gamma_5 TURN + \gamma_6 BETA + \gamma_7 ALPHA + \gamma_8 VOLAT + \gamma_9 YIELD + \gamma_{10} BM \\ & + \gamma_{11} LEV + \gamma_{12} IO(q - 1, g) + \varepsilon \end{aligned} \quad (4),$$

where $\alpha_{industry}$ represents an industry-specific (two-digit SIC) intercept, and all other variables are as defined above. To mitigate the effects of potential statistical problems (for example, model instability over time, heteroscedasticity, cross-sectional correlation of the residual), we estimate (4) for each year (1982–2001) individually and report the time-series means and *t*-statistics of the estimated annual coefficients.

Table 2 presents summary estimates from the cross-sectional regressions (4).¹³ Although all the control variables of model 4 are included in the regressions, we report for parsimony only the accruals coefficients.¹⁴ Coefficient estimates are reported for the full sample period (1982–2001) as well as for two subperiods: 1982–1991 and 1992–2001. Focusing first on transient institutions (the left two columns), the estimates for the full sample period (the bottom row in each panel) suggest that transient institutions start reacting to accruals information in the last quarter of the accruals year (panel B), and proceed to react in each of the first three quarters of the subsequent year (panels C through E). In each of these quarters, the coefficient of *BS_ACC* is negative and significant, indicating that when accruals

are high, a harbinger for future earnings and stock price disappointments, transient institutions decrease their holdings, and vice versa for low accruals.

The apparent reaction of transient institutions to accruals is strongest (that is, the largest absolute value of β coefficient) in the first quarter of the subsequent year (-0.283) — the quarter in which annual earnings and accruals of most companies are publicly reported. The reaction is also quite strong in the last quarter of the accruals year (-0.196), as well as in the second quarter of the subsequent year (-0.200), and is substantially weaker (-0.143) in the third quarter of the subsequent year. Thus, it appears that transient institutions react to accruals rather expeditiously — partially in anticipation of the annual accruals information and mostly in the quarter of disclosure. The subperiod results for transient institutions are similar, except that while the accruals coefficients in both subperiods in panels B, C, and D are significant, the coefficients in the recent period (1992–2001) are larger than in the early period (1982–1991). In particular, the first-quarter coefficient (panel C) for the 1992–2001 period (-0.393) is twice as large as that for the prior 10 years (-0.172). Thus, it is evident that in the 1990s transient institutions enhanced their accruals-related trading. The size of the 1992–2001 first quarter coefficient (-0.393) suggests that firms reporting high (low) accruals experienced, on average, an abnormal decrease (increase) of about 0.2 percentage points in ownership by transient institutions during the first quarter subsequent to the accruals year.¹⁵

The estimates for nontransient institutions in Table 2 (third and second columns from right) are quite different. These investors appear to have incorporated accruals information in their trading only during the 1990s (all the nontransient accruals coefficients for 1982–1991 are insignificant) and, even then, they traded on accruals only during the first quarter of the subsequent year (panel C). Yet, the magnitude of this coefficient is quite large (-0.500 , compared with -0.393 for transient institutions), suggesting that the impact of extreme accruals on ownership by nontransient institutions is about 0.25 percentage points (computed, as in note 15, with the coefficient -0.500). This evidence, coupled with the enhanced response to accruals by transient institutions during the 1990s, indicates that institutions as a whole were more cognizant of accruals information during the 1990s than in the 1980s.

What caused the increase in institutional response to accruals information in the 1990s? A possible reason is the substantial increase in the stock-market share of institutions during that period (e.g., Gompers and Metrick 2001), which may have contributed to the larger and more significant accruals coefficients in the 1990s observed in Table 2. It is also likely that the documentation of the accruals anomaly (Sloan 1996) and its wide recognition in practitioners' circles may have focused institutions' attention on accruals. Finally, it may be that institutions became increasingly concerned during the 1990s with quality-of-earnings problems — mostly involving accruals — given the Securities and Exchange Commission's (SEC's) increasing attention to this issue and evidence that earnings quality deteriorated during that period (e.g., Lev and Zarowin 1999).¹⁶ In fact, the deterioration in earnings quality may have offset the positive impact on prices due to institutions' trade on accruals information, contributing to the persistence of the accruals anomaly (Table 1).

TABLE 2

Summary estimates from cross-sectional regressions of the change in institutional ownership on accruals and control variables

$$\Delta IO(q, g) = \alpha_{industry} + \beta BBS_ACC + \gamma_1 SIZE + \gamma_2 AGE + \gamma_3 ROA + \gamma_4 LOGP + \gamma_5 TURN + \gamma_6 BETA + \gamma_7 ALPHA + \gamma_8 VOLAT + \gamma_9 YIELD + \gamma_{10} BM + \gamma_{11} LEV + \gamma_{12} IO(q - 1, g) + \varepsilon \tag{4}$$

Panel A: Dependent variable is the change in institutional ownership during the third quarter of the accruals year

	Transient		Nontransient		Mean (n)
	Mean (β)	t (β)	Mean (β)	t (β)	
1982-91	-0.061	-0.9	-0.003	-0.0	1,610
1992-2001	-0.042	-0.8	0.337	3.9	2,651
1982-2001	-0.051	-1.2	0.167	2.2	2,131

Panel B: Dependent variable is the change in institutional ownership during the fourth quarter of the accruals year

	Transient		Nontransient		Mean (n)
	Mean (β)	t (β)	Mean (β)	t (β)	
1982-91	-0.188	-2.8	0.173	1.2	1,640
1992-2001	-0.204	-2.2	0.009	0.1	2,726
1982-2001	-0.196	-3.5	0.091	1.1	2,183

Panel C: Dependent variable is the change in institutional ownership during the first quarter of the subsequent year

	Transient		Nontransient		Mean (n)
	Mean (β)	t (β)	Mean (β)	t (β)	
1982-91	-0.172	-2.3	0.017	0.2	1,568
1992-2001	-0.393	-3.9	-0.500	-2.9	2,468
1982-2001	-0.283	-4.3	-0.242	-2.1	2,018

Panel D: Dependent variable is the change in institutional ownership during the second quarter of the subsequent year

	Transient		Nontransient		Mean (n)
	Mean (β)	t (β)	Mean (β)	t (β)	
1982-91	-0.158	-2.2	0.003	0.0	1,564
1992-2001	-0.241	-2.7	-0.165	-1.4	2,467
1982-2001	-0.200	-3.5	-0.081	-1.1	2,015

(The table is continued on the next page.)

TABLE 2 (Continued)

Panel E: Dependent variable is the change in institutional ownership during the third quarter of the subsequent year

	Transient		Nontransient		Mean(<i>n</i>)
	Mean (β)	<i>t</i> (β)	Mean (β)	<i>t</i> (β)	
1982–91	-0.159	-1.6	0.009	0.2	1,560
1992–2001	-0.127	-1.5	0.040	0.5	2,460
1982–2001	-0.143	-2.3	0.024	0.5	2,010

Notes:

The regressions include all the explanatory variables in (4) but, for parsimony, summary statistics (time-series mean and *t*-statistic) are reported only for the accruals coefficient. The dependent variables are as follows:

$\Delta IO(q, g)$ is the change in ownership by institution group *g* (*g* = transient and nontransient) during quarter *q* (*q* = third and fourth quarters of the accruals year and the first, second, and third quarters of the subsequent year). Transient institutions are those that trade frequently in stocks attempting to profit from short-term price changes. Institutional ownership is expressed in percentage points.

BS_ACC is the ratio of accruals, estimated using balance sheet information (1), to average total assets.

SIZE is the logarithm of market value of equity at the end of the year.

AGE is the number of years since the start of coverage period by CRSP.

ROA is operating income divided by average total assets during the year.

LOGP is the logarithm of price per share at the end of the year.

TURN is the logarithm of the average ratio during the year of monthly trading volume to total shares outstanding.

BETA (ALPHA) is the market-model slope (intercept), estimated using all available daily returns during the year and the value-weighted market index.

VOLAT is the residual standard error from the market-model regression.

YIELD is the dividend yield, measured as the total amount of dividends declared on common stock during the year divided by the market value of equity at the end of the year.

BM is the ratio of book value to market value of common equity at the end of the year.

LEV is the ratio of the book value of debt to the market value of total capital (book value of debt plus market value of equity).

IO(q - 1, g) is the level of ownership by the relevant institution group at the end of the previous quarter.

We conclude this section with two robustness checks. First, we reestimate (4) measuring accruals by the cash flow approach, *CFS_ACC* (that is, earnings minus cash from operations). The resulting regression estimates are very similar to those reported in Table 2 for the corresponding years (cash flow information is available since 1988 only). Second, we rerun the analysis using the actual value of accruals deflated by average total assets instead of its cross-sectional rank, and find that the sign, significance, and time-series pattern of the accruals coefficients are all similar to those in Table 2.

4. A deeper examination of the investment-returns lead-lag relationship

In the preceding section, we established that institutional investors, and in particular the active (transient) ones, change their quarterly holdings in tandem with firms' accruals; that is, they tend to increase their holdings in low-accruals firms and decrease holdings in high-accruals firms. This evidence is necessary, but not sufficient, to establish that institutions do trade on accruals information. Specifically, Sloan (1996) and followers showed that stock prices move inversely with accruals, particularly for extreme-accruals firms, in the year of disclosure of the annual report (year $t + 1$). Accordingly, the quarterly changes in institutional holdings that we document (Table 2) may reflect the reaction of institutions to stock price changes, rather than trades based on accruals information.

To establish the nature of the lead-lag relation — namely, to determine whether institutions react to the accruals data rather than to correlated information (for example, stock price changes, earnings announcements) — we perform the following two analyses: (1) We compare the pattern of monthly abnormal stock returns of extreme-accruals firms (return to the zero-investment portfolio) from October of the accruals year (year t) through March of year $t + 2$ with the pattern of change in institutional holding, to determine whether institutional investments lead returns (indicating that institutions trade on accruals information) or lag returns (suggesting that institutions do not actively trade on accruals information).¹⁷ (2) We have documented in Table 2 (panel B) that the change in the holdings of transient institutions in the fourth quarter of the accruals year is significantly (negatively) associated with the size of annual accruals. To focus more sharply on the question of whether institutions react to accruals data or to other correlated variables, we add to (4) a variable reflecting the year-to-date accruals in the third quarter of the accruals year. Unlike annual accruals information, which becomes publicly available during the subsequent year, the year-to-date third-quarter accruals information becomes available to investors in the fourth quarter of the accruals year. Thus, if institutions trade on accruals information, the change in institutional ownership in the fourth quarter should be significantly related to the year-to-date third-quarter accruals and insignificantly related to annual accruals. In contrast, if institutions react to information that happens to be correlated with annual accruals, the information in annual accruals may not be subsumed by the year-to-date third-quarter accruals. We now report the results of the two analyses.

Trading on accruals or chasing stock prices?

We perform the following analysis to establish whether transient institutions trade on accruals information or react to changes in the stock prices of extreme-accruals firms. First, for each of the 18 months from October of the accruals year (year t) through March of year $t + 2$, we calculate the cumulative abnormal stock return (size and book-to-market adjusted) earned from September of year t through that month on a zero-investment portfolio: long in low-accruals firms (lowest decile) and short in high-accruals firms (highest decile). We perform this return computation for each sample year (1982–2001) and average each of the 18 cumulative monthly abnormal returns across the 20 sample years. Finally, we standardize the average cumulative returns series by dividing each of the 18 average cumulative monthly abnormal returns by the average cumulative abnormal return for the entire 18-month period, and present the resulting series in Figure 2 (the dotted line). Note that if the same abnormal returns are earned each month, the dotted line would be linear from zero (month 9 of year t) to one (month 3 of year $t + 2$). Instead, the dotted line in Figure 2 is flat until $2/t + 1$ (February of the year following the accruals), and increases in an approximately linear fashion through month $3/t + 2$. Thus, the gains to the accruals anomaly start to accrue 2 months after the end of the fiscal year and are earned monotonically through March of year $t + 2$.

Figure 2 also presents the standardized average cumulative residual investment by transient institutions in the same extreme-accruals firms. For each of these firms, cumulative residual investment is calculated as the portion of the cumulative change in institutional holdings that is not explained by the regular determinants of institutional ownership (that is, the control variables of (4)). That is,

$$\begin{aligned} \text{Cumulative residual investment}(q, g) = & \text{Cumulative } \Delta IO(q, g) - (\alpha_{\text{industry}} \\ & + \gamma_1 \text{SIZE} + \gamma_2 \text{AGE} + \gamma_3 \text{ROA} + \gamma_4 \text{LOGP} \\ & + \gamma_5 \text{TURN} + \gamma_6 \text{BETA} + \gamma_7 \text{ALPHA} \\ & + \gamma_8 \text{VOLAT} + \gamma_9 \text{YIELD} + \gamma_{10} \text{BM} \\ & + \gamma_{11} \text{LEV} + \gamma_{12} \text{IO}), \end{aligned}$$

where *Cumulative* $\Delta IO(q, g)$ measures the change in ownership by institution group g from the beginning of the fourth quarter of the accruals year through quarter q , and the regression coefficients are estimated by regressing (4) with *Cumulative* $\Delta IO(q, g)$ as the dependent variable instead of (the noncumulative) $\Delta IO(q, g)$.¹⁸ Thus, *Cumulative residual investment*(q, g) captures the part of the cumulative change in institutional holding that is not explained by the various firm and stock attributes found generally to affect the level and change of institutional holding.

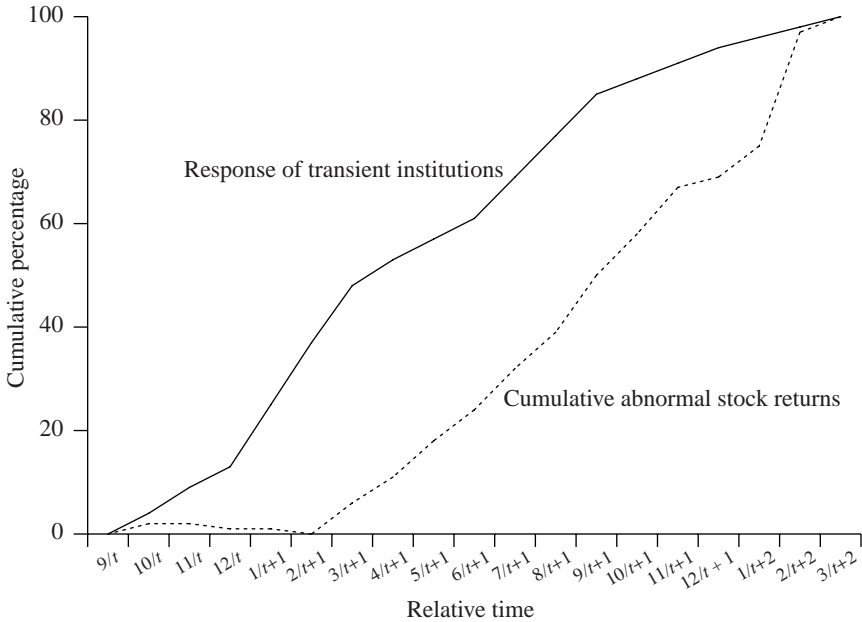
Similar to the calculation of the cumulative abnormal returns series, we calculate for each year the difference between the average cumulative residual investment in low- and high-accruals firms, average this difference over the sample years, and standardize it by the average cumulative residual investment over the entire 18 months. Comparing the cumulative abnormal returns with the cumulative residual investments in Figure 2, it is evident that transient institutions start reacting to the

accruals information before the change in stock price. In fact, institutions complete more than 40 percent of their 18-month reaction before the accruals anomaly even starts (month $2/t + 1$), and finish 85 percent of the reaction when the accruals-related price anomaly is half way through (month $9/t + 1$). We therefore conclude that transient institutions do trade actively and in a timely manner on accruals information.

Do institutions react to third-quarter accruals?

The estimates of panel B, Table 2, suggest that transient institutions start reacting to accruals information during the fourth quarter of the accruals year, prior to the release of the annual accruals information. During that quarter, companies report the third-quarter results, and so the estimates in panel B of Table 2 may reflect the reaction of transient institutions to this quarterly accruals information. To examine this conjecture, we rerun (4), adding to the independent variables the year-to-date

Figure 2 The timeliness of the response of transient institutions to accruals information



Note:

This figure presents the standardized cumulative abnormal return earned on a zero-investment portfolio — long in low-accruals firms (lowest decile) and short in high-accruals firms (highest decile) — purchased in the September of year t and held through the indicated month. The standardization is by the average cumulative abnormal returns from September of the accruals year (year t) through March of year $t + 2$. The figure also displays the standardized average cumulative residual investment in the same extreme-accruals firms by transient institutions (section 4 elaborates on the calculation of these series).

third-quarter accruals (*BS_ACC3*).¹⁹ If transient institutions indeed react to the accruals information disclosed in the third quarterly report, the coefficient of *BS_ACC3* should be negative and significant while that of *BS_ACC* (reflecting annual accruals) should be insignificant because fourth-quarter accruals are not yet available to market participants. The estimates in Table 3 confirm this conjecture. The coefficient of the third-quarter year-to-date accruals, β_2 , is indeed negative and significant for the entire sample period, as well as for the two subperiods, while the coefficient of the annual accruals, β_1 , is insignificant. This evident reaction to quarterly accruals is yet another indication of the prompt response to accruals information by transient institutions.

5. Explanations for the persistence of the accruals anomaly

The analysis in the previous sections indicates that institutions, particularly transient (active) ones, do react to accruals information in a timely manner. Such trading should decrease the extent of the accruals anomaly, and ultimately lead to its demise. However, this is clearly not the case. As has been shown by Collins et al. 2003 and Bushee and Raedy 2003, the accruals anomaly persists, and our analysis (Figure 1 and Table 1) does not indicate any abatement of the anomaly. So, why are the accruals-related activities of institutional investors not affecting the anomaly? We answer this question below by showing that although institutions do react to accruals information, their reaction is very small relative to the normal institutional trade, and therefore incapable of seriously counteracting the anomaly. This finding, in turn, raises two questions that lead to the following additional analyses:

TABLE 3

Summary estimates from cross-sectional regressions of the change in ownership by transient institutions in the fourth quarter of the accruals year on annual accruals, accruals during the first three quarters of the year, and control variables

$$\Delta IO(4; t, g) = \alpha_{industry} + \beta_1 BS_ACC + \beta_2 BS_ACC3 + \gamma_1 SIZE + \gamma_2 AGE + \gamma_3 ROA + \gamma_4 LOGP + \gamma_5 TURN + \gamma_6 BETA + \gamma_7 ALPHA + \gamma_8 VOLAT + \gamma_9 YIELD + \gamma_{10} BM + \gamma_{11} LEV + \gamma_{12} IO(q - 1, g) + \epsilon$$

	Mean (β_1)	<i>t</i> (β_1)	Mean (β_2)	<i>t</i> (β_2)	Mean (<i>n</i>)
1982–91	-0.013	-0.3	-0.204	-4.5	1,275
1992–2001	-0.130	-1.5	-0.135	-2.3	2,282
1982–2001	-0.072	-1.4	-0.170	-4.6	1,778

Note:

The regressions include all the explanatory variables listed above but, for parsimony, summary statistics (time-series mean and *t*-statistic) are reported only for the accruals coefficients. *BS_ACC3* is the ratio of accruals during the first three quarters of the accruals year, estimated using balance sheet information, to average total assets. Other variables are as defined in Table 2.

1. Why is the accruals-related trade so small? We show that extreme-accruals firms have characteristics (for example, small size, low profitability, and high residual return volatility) that for reasons of liquidity and prudent-man constraints are unattractive to institutions. Consequently, institutions, by and large, shy away from extreme-accruals firms, thereby allowing the anomaly to persist.
2. If institutions shy away from extreme-accruals stocks, why do individuals not enter the fray by trading vigorously on the accruals anomaly? In answer to this question, we show in section 6 that a profitable exploitation of the anomaly requires relatively large portfolios, heavily tilted toward the short side (selling short high-accruals firms). Such investment strategy requires high information-processing and transaction costs, calling into question the profitability of the accruals strategy for individual investors.

Taken together, we document systematic impediments to a pervasive and profitable accruals strategy, most likely explaining the persistence of the phenomenon.

The light institutional trade on the accruals anomaly

We estimated in section 3 that the accruals-related change in institutional ownership during the first quarter following the accruals year — the quarter with the heaviest accruals-related trade — amounts to about 0.2–0.3 percent of shares outstanding for extreme-accruals firms. How large is this ownership change? To address this question, we calculate the mean and median of the absolute value of the change in firms' institutional ownership during the first calendar quarter of the sample years. For the recent sample period (1992–2001), the mean (median) absolute change was 3.8 percent (1.9 percent) for transient institutions, and 4.6 percent (2.7 percent) for nontransient institutions.²⁰ Thus, the accruals-related ownership change of about 0.2–0.3 percent for extreme-accruals firms amounts to substantially less than 10 percent of the mean ownership change in the first calendar quarter and roughly 10 percent of the median change. Such a small trade in reaction to the accruals information is obviously not powerful enough to substantially affect the accruals anomaly. This, however, begs the question, “Given the potential profitability of accruals-based trading (Bushee and Raedy 2003), why is the institutional exploitation of the accruals anomaly so timid?” We address this question as follows.

The mismatch between extreme-accruals firms and those sought by institutions

We compare the profile of firms favored by institutional investors with that of extreme-accruals firms, to examine whether the restricted trade on the accruals anomaly can be attributed to a mismatch of characteristics. We perform this analysis by focusing on the various firm and stock characteristics established by previous research to explain institutional holding, which served as control variables in (4). For each of these characteristics, we compute annual cross-sectional correlations with institutional holdings and with extreme accruals. Thus, for example, for the year 1990 we correlate across all sample firms the level of institutional holding

with firm size (a characteristic). Similarly, we correlate cross-sectionally the relative magnitude of the firm's accruals with firm size. We then compare the set of correlations that reflects firm characteristics favored by institutions to the correlations that indicate the characteristics of extreme-accruals firms.

We use two dimensions of institutional ownership in this analysis: (1) the level of ownership at the beginning of the fourth quarter of the accruals year (when we first detect institutional trade related to accruals; Table 2), and (2) the absolute value of the change in institutional ownership from the beginning of the fourth quarter of the accruals year through the end of the third quarter of the subsequent year (a period encompassing trade related to accruals; Table 2). We also use three measures of extreme accruals: (1) an indicator variable that equals one for firm-years in the bottom or top deciles of accruals and zero otherwise (indicating extreme-accruals firms), (2) an indicator variable that equals one for firms in the top accruals decile and zero otherwise (indicating firms with extreme positive accruals), and (3) an indicator variable that equals one for firms in the bottom accruals decile, and zero otherwise (indicating firms with extreme negative accruals).

Table 4 presents the time-series means and *t*-statistics (over the period 1982–2001) of the annual cross-sectional correlations of firm characteristics with the two measures of institutional activity (ownership level and change) and the three measures of extreme accruals. We will discuss the correlations for the level of institutional holding (left column in Table 4), and those for extreme-accruals firms in both the top and bottom deciles (third column from left in Table 4). It is evident from the sign and significance of the correlations that institutions prefer to own large companies (*SIZE*), while extreme accruals are prevalent in small ones (the correlation coefficients, 0.645 and -0.226 , are of opposite sign and highly significant). Similarly, institutions prefer to hold the stock of mature (*AGE*) and profitable (*ROA*) firms that have relatively large share prices (*LOGP*), while the converse characteristics (young, low profitability, and low share price) typify extreme-accruals firms. In addition, extreme-accruals firms have high residual return volatility (*VOLAT*) and low dividend yield (*YIELD*), while institutions hold firms with low volatility and high dividend yield. The profile of the absolute change in institutional holding (second from left column of Table 4) is generally similar to that of the ownership level.

Given that the firm characteristics we examine are correlated to some extent (for example, firm size and price per share), we next conduct a multivariate analysis in which we regress the two measures of institutional holding (level and trading) and the three indicators of extreme-accruals firms on the various firm characteristics, controlling for fixed industry effects. To mitigate econometric problems associated with using dichotomous dependent variables for the three extreme-accruals regressions (the dependent variable is 0 or 1), we use the logit methodology for these regressions. We run the five regressions for each sample year and report, in Table 5, the time-series means and *t*-statistics of the annual cross-sectional estimated coefficients. Consistent with the correlations reported in Table 4, we find in the multivariate analysis of Table 5 that institutions prefer to trade in the stock of large firms (*SIZE*) with a high share price (*LOGP*), while extreme-accruals firms are rela-

TABLE 4

Time-series means and *t*-statistics of annual cross-sectional correlations of firm characteristics with measures of institutional activity and extreme accruals

	Institutions		Accruals		
	Holding	Trading	Extreme	High	Low
<i>SIZE</i>	0.645	0.164	-0.226	-0.129	-0.173
	111.1	14.4	-31.8	-28.8	-22.9
<i>AGE</i>	0.325	-0.052	-0.177	-0.150	-0.086
	16.7	-2.5	-24.2	-19.0	-15.6
<i>ROA</i>	0.302	0.077	-0.133	0.037	-0.214
	52.3	7.0	-11.6	4.1	-24.3
<i>LOGP</i>	0.623	0.173	-0.222	-0.080	-0.216
	145.3	17.9	-23.0	-11.6	-25.5
<i>TURN</i>	0.218	0.249	0.101	0.124	0.011
	10.3	21.9	9.6	10.4	1.2
<i>BETA</i>	0.256	0.149	0.037	0.053	-0.004
	9.8	17.3	3.3	4.6	-0.4
<i>ALPHA</i>	-0.087	0.042	0.014	0.048	-0.029
	-4.1	5.9	1.0	4.6	-2.3
<i>VOLAT</i>	-0.481	-0.076	0.236	0.109	0.206
	-43.1	-7.9	47.0	20.4	28.2
<i>YIELD</i>	0.158	-0.038	-0.188	-0.137	-0.114
	11.5	-3.5	-20.2	-15.3	-18.8
<i>BM</i>	-0.093	-0.064	-0.057	-0.090	0.014
	-6.7	-7.7	-6.7	-9.3	1.5
<i>LEV</i>	-0.024	-0.007	-0.073	-0.098	0.002
	-1.4	-0.6	-8.1	-10.5	0.2

Note:

For each firm characteristic, the first (second) row reports the time-series mean (*t*-statistic) of the annual cross-sectional correlation coefficients. The average number of observations per year is 2,012. The sample period is 1982–2001. “Holding” is the level of institutional ownership at the end of the third fiscal quarter. “Trading” is the absolute value of the change in institutional ownership during the 12 months starting at the beginning of the fourth quarter. “Extreme” is an indicator variable that equals one for firm-years in the bottom or top deciles of accruals in that year. “High” is an indicator variable that equals one for firms in the top accruals decile. “Low” is an indicator variable that equals one for firms in the bottom accruals decile. Other variables are as defined in Table 2.

tively small with low share prices. In contrast to the bivariate correlations in Table 4, Table 5 indicates that profitability (*ROA*) is insignificantly related to institutional trading (but still positively related to the level of holding), and the relation between extreme accruals and residual return volatility is only marginally significant. These results suggest that the bivariate differences in profitability and volatility between firms favored by institutional investors and extreme-accruals firms are proxying for other characteristics (particularly size) rather than representing unique factors. Interestingly, the book-to-market ratio (*BM*) now emerges as strongly differentiating between extreme-accruals firms and institutional preference. It appears that institutions prefer to trade in (or hold) the stock of high book-to-market firms (perhaps reflecting value investment strategies or a focus on capital-intensive firms), while extreme-accruals firms are characterized by low book-to-market ratios, which are typical of high-growth, intangibles-intensive enterprises.

The findings reported in Tables 4 and 5 thus suggest that the light response of institutions to accruals information is at least partially due to the largely unattractive characteristics of extreme-accruals firms. Because institutions tend to avoid these characteristics, the trading positions that they take in extreme-accruals firms are not large enough to arbitrage away the accruals anomaly. But why are institutions willing to “leave money on the table”, forgoing the potential gains from an accruals strategy? The answer lies in prudent-man laws and liquidity concerns of institutions. Del Guericco (1996, 32) describes prudent-man laws thus:

Prudent-man laws purport to protect beneficiaries [investors] by allowing them to seek damages from a fiduciary [institutional investor] who fails to invest in their best interest. However, what the courts accept as prudent investment has been based primarily on the characteristics of assets in *isolation*, and ignores the role an asset plays in the overall portfolio. As a result, fiduciaries under this law have an incentive to protect themselves from liability by tilting their portfolios toward high-quality assets that are easy to defend in courts.

What are these “high-quality assets that are easy to defend in courts”? Del Guericco’s empirical analysis indicates that they are primarily large, mature, profitable, and high book-to-market companies — obviously not those having extreme accruals (our Tables 4 and 5). Furthermore, as argued by Gompers and Metrick 2001 (238), “The large positions held by institutions may lead them to demand stocks with large market capitalizations and thick markets [liquid].” Thus, prudent-man laws and liquidity preferences lead most institutional investors to forgo the potential gains from an accruals strategy, thereby allowing the accruals anomaly to persist.

So much for institutional investors. What about individual investors? Because they are not bound by prudent-man laws and liquidity concerns, why do they not trade aggressively to exploit the accruals anomaly? We turn next to this final question.

TABLE 5

Summary statistics from cross-sectional regressions examining the firm characteristics preferred by institutions and typical of extreme-accruals firms

$$Y = \alpha_{industry} + \gamma_1 SIZE + \gamma_2 AGE + \gamma_3 ROA + \gamma_4 LOGP + \gamma_5 TURN + \gamma_6 BETA + \gamma_7 ALPHA + \gamma_8 VOLAT + \gamma_9 YIELD + \gamma_{10} BM + \gamma_{11} LEV + \varepsilon$$

Y	Institutions (ordinary least squares)		Accruals (logit)		
	Holding	Trading	Extreme	High	Low
SIZE	4.716	0.532	-0.223	-0.339	-0.107
	29.2	7.1	-11.2	-15.4	-4.5
AGE	0.095	-0.070	-0.015	-0.039	0.003
	11.4	-7.3	-8.7	-8.5	1.1
ROA	4.055	0.364	-0.218	2.066	-2.088
	5.0	1.0	-1.7	7.0	-8.9
LOGP	5.930	0.676	-0.113	0.063	-0.210
	20.8	8.9	-3.0	1.8	-4.5
TURN	4.868	2.564	0.266	0.319	0.023
	9.0	8.0	7.3	5.8	0.7
BETA	-0.908	-0.089	0.138	0.167	0.098
	-1.3	-0.5	5.8	2.8	2.0
ALPHA × 100	-9.139	2.064	0.015	0.207	-0.190
	-11.4	6.5	0.2	1.8	-1.2
VOLAT	-32.427	-20.199	3.044	-5.787	7.085
	-2.6	-4.2	1.6	-2.0	3.7
YIELD	-97.778	-17.764	-8.507	-16.190	-3.025
	-8.1	-5.1	-6.8	-5.5	-2.3
BM	4.330	0.458	-0.492	-0.816	-0.142
	13.3	4.2	-10.9	-9.7	-3.1
LEV	3.683	3.178	-0.143	-0.441	0.230
	3.2	14.4	-1.2	-1.9	2.7
R ²	0.555	0.148	0.158	0.096	0.078

Note:

For each variable, the first (second) row reports the time-series mean (*t*-statistic) of the annual cross-sectional coefficients. The average number of observations per year is 2,012. The sample period is 1982–2001. “Holding” is the level of institutional ownership at the end of the third fiscal quarter. “Trading” is the absolute value of the change in institutional ownership during the 12 months starting at the beginning of the fourth quarter. “Extreme” is an indicator variable that equals one for firm-years in the bottom or top deciles of accruals in that year. “High” is an indicator variable that equals one for firms in the top accruals decile. “Low” is an indicator variable that equals one for firms in the bottom accruals decile. Other variables are as defined in Table 2.

6. Individual investors

The seeming simplicity of implementing the accruals strategy leads one to expect a considerable number of individual investors to act on it. Individual investors are, however, generally subject to information-processing and transaction costs that are substantially larger than those of institutional investors, because they are often unable to benefit from economies of scale in investing, such as the cost of accessing specialized data bases. Information-processing costs increase primarily with the number of securities in the portfolio. With respect to accruals, investors have to periodically derive accruals information for a large number of firms in order to identify even a small set of extreme-accruals companies (for example, to identify 30 extreme-accruals firms — the minimum, as we show below, for a consistently profitable accruals strategy — an investor would have to analyze about 150 companies). In addition, individuals' trade commissions typically have a fixed, per-transaction component. We therefore examine the number of securities required to successfully implement an accruals investment strategy.²¹

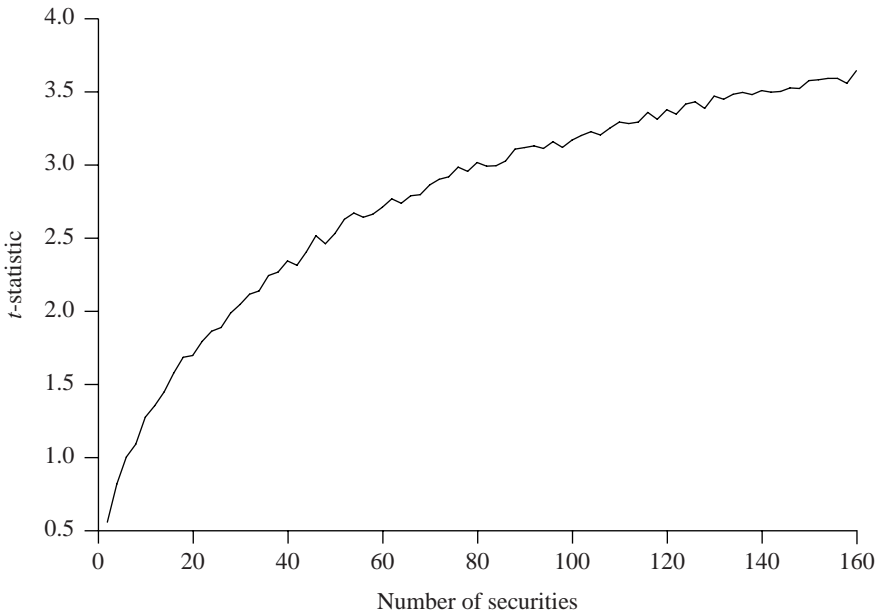
Specifically, for increasing values of n — the number of securities in the portfolio — ($n = 2, 4, 6, \dots, 160$), and for each sample year (1965 through 2002), we randomly select $1/2n$ securities from the low-accruals decile and $1/2n$ securities from the high-accruals decile. We then calculate the mean abnormal (size and book-to-market adjusted) return in the subsequent year on a zero-investment portfolio with equal weights in the long (low-accruals) and short (high-accruals) stocks.²² Next, to indicate the likelihood of gains, we calculate (1) the t -statistic associated with the time-series mean of the portfolios' abnormal return, and (2) the frequency of years (during 1965–2002) in which the portfolio abnormal return was positive. We repeat the simulation 500 times and calculate the mean values of these t -statistics and frequencies across the 500 replications. The purpose of this simulation is to ascertain the relationship between portfolio size and the consistency of gains from implementing an accruals investment strategy.

Figure 3 plots the relationship between the mean t -statistic of abnormal returns and the number (n) of securities in the portfolio, and Figure 4 portrays the relationship between the mean frequency of positive abnormal returns and the number of securities in the portfolio. The need for a relatively large portfolio in order to consistently generate gains from an accruals strategy is evident from both figures. While the mean abnormal return across the 500 replications is 9.4 percent for the various values of n that we consider, the statistical significance of gains (Figure 3) and the frequency of positive returns (Figure 4) are positively and strongly related to the number of securities in the portfolio. Figure 3 indicates that for an investor using the accruals strategy during the sample period, the portfolios had to include at least 30 securities in each year for the returns to be statistically significant (t -statistic of return > 2.0). Even then, the strategy would have yielded positive abnormal returns (before transaction costs) in fewer than two-thirds of the years (Figure 4). In contrast, with 10 securities in the portfolio, for example, abnormal returns were positive in less than 60 percent of the years and were statistically insignificant over the sample period. Asymptotically, the t -statistic converges to 4.9 and the gain frequency converges to 76 percent. Thus, from a starting point of 30 securities in the

portfolio, substantial improvements in the consistency of gains (before transactions costs) can be obtained through the addition of a relatively large number of securities to the portfolio. Figures 3 and 4 thus demonstrate the substantial number of securities and the consequent high information-processing and transaction costs associated with successfully implementing an accruals strategy.²³ These are obviously serious impediments to widespread trading on accruals information by individual investors.

The high cost of short sales augments significantly the portfolio-size-related transaction costs of an accruals strategy. Table 1 demonstrates that the potential gains from an accruals strategy lie mostly with high accruals, which require short sales. For example, for the NYSE and AMEX firms (the left column of Table 1),

Figure 3 Statistical significance of a profitable accruals strategy as a function of portfolio size



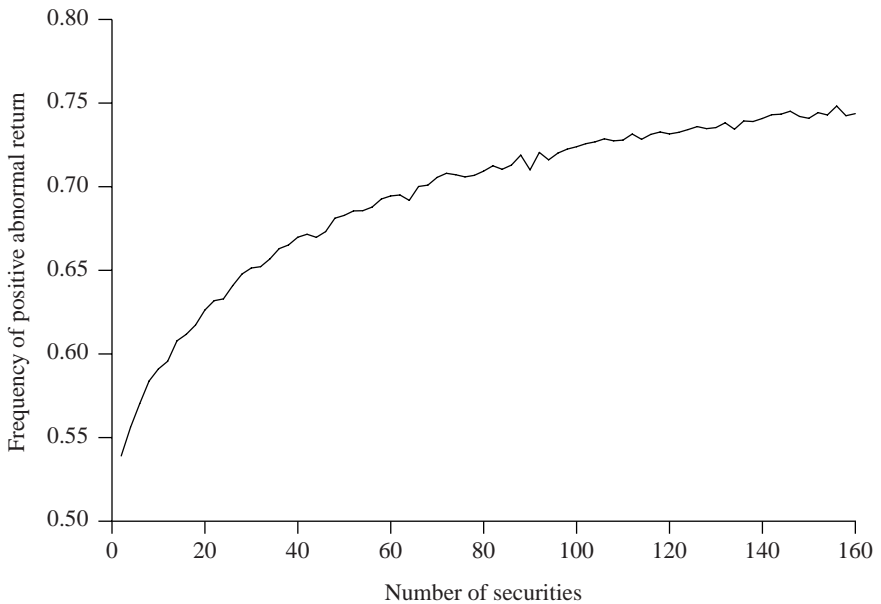
Note:

This figure plots the mean over 500 replications of the t -statistic associated with the time-series mean of abnormal portfolio return to an accruals strategy during the period 1965–2002, as a function of the number of securities in the portfolio (n). The strategy takes equal-weight long positions in $0.5*n$ firms selected randomly from the low-accruals decile each year, and short positions in $0.5*n$ firms from the high-accruals decile. Abnormal return is measured as the difference between the firm's return and the contemporaneous return on a matched portfolio based on size (five quintiles) and book-to-market (five quintiles for each size quintile). Returns are measured from May 1 through April 30 of the following year.

the average annual gain from the short sales of high accruals is 4.8 percent (highly significant), while the gain from the low accruals is only 1.8 percent (barely significant). Thus, roughly 75 percent of the total gain from the zero-investment portfolio (long on low accruals and short on high accruals) comes from the high end of accruals. Realization of this gain requires short sales whose transaction costs are very large, especially for individual investors. Ali and Trombley (2004, 8–11) outline the sources of these costs, highlighting the large impact on individual investors:

[T]he short seller first locates an existing owner of the security who is willing to lend the shares. The short seller leaves collateral of 102 percent of the borrowed shares' market value and the collateral is adjusted daily on the basis of

Figure 4 Frequency of positive abnormal return from trading on accruals information as a function of portfolio size



Note:

This figure plots the mean over 500 replications of the relative frequency of years during the period 1965–2002 in which an accruals strategy resulted in positive abnormal returns in the subsequent year, as a function of the number of securities in the portfolio (n). The strategy takes equal-weight long positions in $0.5*n$ firms selected randomly from the low-accruals decile each year, and short positions in $0.5*n$ firms from the high-accruals decile. Abnormal return is measured as the difference between the firm's return and the contemporaneous return on a matched portfolio based on size (five quintiles) and book-to-market (five quintiles for each size quintile). Returns are measured from May 1 through April 30 of the following year.

changes in market value. The borrower also pays the lender a fee, which for cash collateral transactions is embedded in the rebate rate, interest paid by the lender to the short seller. ... [The] cost of short selling for retail [individual] investors is greater than that of institutional investors, because retail investors typically receive no interest on their short-sale proceeds. ... Besides loan fee, another potentially important shorting cost is the risk that a short position will have to be involuntarily closed due to recall of the stock loan ... about 2 percent of shorted stocks were recalled each month.

Ali and Trombley quote estimates of the short sales loan fees, ranging from 0.20 percent to 4.72 percent. Given the characteristics of extreme-accruals firms documented in the previous section (for example, small size, high volatility), the costs of shorting or even acquiring these stocks are likely to be substantial. Thus, the high information-processing and transaction costs of an accruals investment strategy likely preclude most individual investors and even some institutions from systematically implementing such a strategy.

7. Summary

In this study we investigate the unexpected persistence of the accruals anomaly, despite its substantial potential gains to arbitrageurs and wide recognition among academics and practitioners. Most surprisingly, as we show, the anomaly is not abating, despite the documented trade on accruals by institutional investors. We find, however, that this type of trade — the portion of the quarterly change in institutional ownership that is attributed to accruals information — amounts only to 0.2–0.3 percent of ownership change (in the first quarter following the accruals year). This accruals-related ownership change is substantially lower than 10 percent of the mean absolute quarterly change in institutional ownership for both transient and nontransient institutions. Such light accruals-related trading by institutions is obviously insufficient to materially affect the extent of the accruals anomaly.

Why is accruals-related trading by institutions so timid? By comparing the attributes of extreme-accruals firms with those favored by institutional investors we show that the characteristics of extreme-accruals firms (for example, small size, low book-to-market ratio) are undesirable to many institutional investors, who face prudent-man laws, liquidity concerns, and other constraints on their activities. Accordingly, these institutions forgo much of the potential gains from an accruals strategy and play a very limited role in counteracting the accruals anomaly. And why are individual investors not trading vigorously on accruals information? We show that implementing a consistent-gain accruals strategy involves high information-processing and transaction costs due primarily to the relatively large number of securities involved and the intensity of the required short sales. These costs are especially onerous for individual investors. Given the relative permanence of the fundamental factors inhibiting a wide use of the accruals strategy by both institutions and individual investors, it is likely that the accruals anomaly will endure for quite some time.

Endnotes

1. Prior studies have documented both momentum investing and herding behavior by institutions (e.g., Grinblatt, Titman, and Wermers 1995; Wermers 1999), which could lead to an untimely and protracted response of institutions to accruals information.
2. In a related, concurrent study, Mashruwala, Rajgopal, and Shevlin (2004) report that the accruals anomaly is predominant among firms with high idiosyncratic return volatility. This attribute is unattractive to institutions, thereby providing another reason for the persistence of the accruals anomaly.
3. This restriction guarantees that the same information on all sample firms is available (from quarterly and annual reports) for each of the analyses described below.
4. For the accruals year 2002, we measure returns over an eight-month period, from May 1, 2003 through December 31, 2003.
5. When data items #1, #34, or #71 are missing, we set their values to zero.
6. These abnormal returns are slightly smaller than in Sloan 1996 due to sample and methodological differences, including our focus on December fiscal year-end firms, inclusion of NASDAQ firms, and the use of size and book-to-market adjusted returns instead of Sloan's size-adjusted returns.
7. To the extent that accruals are correlated over time, a seemingly delayed reaction to accruals information may in fact represent timely reaction to subsequent accruals (although one may argue that sophisticated investors should anticipate such a correlation).
8. Bushee's 1998 classification of institutional investors is based on their past investment patterns, as reflected in portfolio turnover, diversification, and momentum trading.
9. We thank Brian Bushee for making his institutional classification data available to us.
10. Note that as a result of applying this procedure, *BS_ACC* and *CFS_ACC* range between zero and one, with values close to one (zero) for firm-year observations with the highest (lowest) accruals in that year. As discussed below, our results are qualitatively similar when we use the actual values of accruals instead of the standardized ranks.
11. The market model is a time-series regression of the stock's return on the overall market return. The slope coefficient, *BETA*, estimated from this model is a widely used measure of systematic risk, and the intercept *ALPHA* reflects average abnormal return.
12. One could, of course, regress the change in institutional ownership on the change in the control variables. This is unsatisfactory for various reasons. First, when institutions obtain additional funds, they are likely to invest the funds in firms with attractive characteristics (for example, large size), leading to the change in ownership (additional investment) being related to the levels of the controls, rather than their changes. Second, because we examine quarterly changes in institutional ownership, the change in the control variables (for example, size, leverage) is likely to be very small. Finally, and more subtly, a regression of the change in institutional ownership on the change in the control variables will likely suffer from endogeneity, because a trade of institutions based on accruals information will affect some of the control variables, such as the market value of equity, or return volatility (see, e.g., Sias 1996; Bushee and Noe 2000). For these reasons we opted against the use of the change in the control variables in our analysis. Nevertheless, we obtain qualitatively similar results to those reported when we add the contemporaneous changes in the control variables to (4).

13. To mitigate the effect of influential observations, we delete in each year observations for which any of the variables in the regression lie outside the 0.5–99.5 percent range of its sample distribution.
14. Overall we find that the control variables have the expected signs consistent with prior studies. Table 5 below presents estimates from regressions of institutional ownership on the control variables.
15. This is the coefficient (–0.393) times 0.5 (the absolute value of the difference between the value of *BS_ACC* for extreme-accruals firms, which is 0 or 1, and the average value of *BS_ACC*, which is 0.5).
16. During the 1990s, the Securities and Exchange Commission (SEC) significantly increased the pressure on public companies to curtail earnings management. Because most instances of earnings management do not involve cash, but rather a shift of accounting income from one period to another, earnings management affects the level of accruals. The SEC’s focus on earnings quality was obviously on the minds of institutional investors.
17. Ideally, we would compare monthly returns with monthly changes in institutional holding. The latter, however, are available only on a quarterly basis.
18. In addition, for these regressions, the beginning-of-period *IO* (the last control variable in (4)) is measured at the beginning of the fourth quarter of the accruals year in all cases (rather than at the beginning of the respective quarter).
19. We calculate accruals in the first three quarters consistent with the annual accruals measure (1):

$$BS_ACC3 = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta ITP) - Dep,$$

where

ΔCA = change in current assets ($\Delta\#40$),

$\Delta Cash$ = change in cash and cash equivalents ($\Delta\#36$),

ΔCL = change in current liabilities ($\Delta\#49$),

ΔSTD = change in debt included in current liabilities ($\Delta\#45$),

ΔITP = change in income taxes payable ($\Delta\#47$), and

Dep = annual depreciation and amortization expense ($\#5$).

All changes are measured as the difference between the level of the variables at the end of the third quarter and the level at the end of the prior fiscal year. We measure the deflator, average total assets, as the average of total assets ($\#44$) at the end of the third quarter of the accruals year and the end of the prior fiscal year. Finally, similar to *BS_ACC*, we replace the actual values of *BS_ACC3* by its cross-sectional rank, scaled by the number of cross-sectional observations.

20. For the earlier sample period (1982–1991), the mean (median) change in firms’ ownership by institutions was 2.3 percent (1.0 percent) for transient institutions, and 3.9 percent (2.1 percent) for nontransient institutions.
21. For most institutional investors, unlike for individuals, information-processing and transaction costs do not vary substantially with the number of transactions. These

investors often subscribe to computerized data bases and pay little or no commissions for executing transactions.

22. We obtain similar results when using each of the alternative approaches for measuring abnormal returns described in section 2.
23. Bushee and Raedy (2003) also analyze the effect of portfolio size on the profitability of an accruals strategy. Their analysis, however, differs from ours in several respects. Most importantly, their portfolio size analysis focuses on the price-impact cost. A larger portfolio size implies smaller investments in individual securities, and hence a lower price impact and a higher gain from the accruals strategy. In contrast, in our pre-transaction cost analysis, a larger number of securities in the portfolio leads to a decrease in the standard error of the return, enhancing the statistical significance of gains from an accruals strategy. Bushee and Raedy's and our analyses thus highlight different sources of gains.

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