The Accrual Anomaly: Accrual Originations, Accrual Reversals, and Investor Learning

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Abstract

We test whether the earnings fixation hypothesis fully explains the accrual anomaly. For this, we develop and empirically validate a novel method for ex-ante detecting accrual originations and their reversals. We demonstrate that the earnings of both types of accruals are of low persistence, and therefore, both types should be mispriced if investors naively fixate on earnings. However, pricing tests show that only originating, but not reversing, accruals are mispriced; and that the mispricing ends by the time accruals reverse. These results are consistent with investors' initial fixation on earnings, followed by gradual learning and correction of the mispricing. We find that analysts' earnings forecast revisions reflect the differential implications of accrual originations and reversals for future earnings. Thus, the revisions are likely one channel through which investors learn and correct the mispricing. We further demonstrate that our findings can be useful for improving the accrual-based trading strategy by ex-ante detecting and removing accrual reversals from extreme accrual portfolios.

Keywords: Accrual Anomaly, Accrual Origination, Accrual Reversal, Earnings Fixation, Investor Learning, Analysts' Forecast Revisions

1. Introduction

The significant negative association between extreme current accruals and subsequent abnormal stock returns, the accrual anomaly, has been the subject of extensive research since its discovery by Sloan (1996). The explanation that Sloan proposed was that investors' fixation on earnings, the fixation hypothesis, leads them to overestimate the persistence of accruals relative to that of cash flows, which results in stock mispricing. Specifically, Sloan (1996) suggests that "*if investors naively fixate on earnings, then they will tend to overprice (underprice) stock in which the accrual component is relatively high (low)*" (p. 292).[1] However, in this paper we provide evidence that a naïve earnings fixation cannot completely explain the accrual anomaly.

The accrual process consists of two stages. In the first stage, an accrual is originated to account for timing differences between the economic transaction and its cash realization. In the second stage, when cash has been realized or it has become evident that cash will not be realized, the original accrual is reversed (closed).[2] We note that the originating and reversing types of accruals have not been explicitly considered in either Sloan's theory or its testing, and we argue that considering both types of accruals helps in understanding whether the fixation hypothesis fully explains the anomaly. That is, if both types of extreme accruals (as we confirm in this paper) lead to earnings of low persistence, and investors naively fixate on earnings, then both accrual originations and accrual reversals should be mispriced. Consequently, the mispricing should be observed beyond the points of accrual originations and reversals. Yet, the critical point is that accrual reversals are fundamentally different from accrual originations on two counts. First, while the origination of a new accrual represents a "new event," and therefore, might be

[1] For a review of the accrual anomaly literature, including alternative explanations for the accrual anomaly, refer to Sections 4.3.1.3, 4.3.2.2, 4.3.3.1, and 4.3.4.1 in Richardson, Tuna, and Wysocki (2010).

[2] For example, when inventory is purchased, inventory accrual is originated. When the inventory is sold or determined to be obsolete and is written off, the original inventory accrual is reversed (closed).

hard to understand and price correctly at first, the accrual reversal represents an accrual "with a history" that can be linked to the original accrual and can resolve the uncertainty related to the original accrual. Second, any estimation error in the originating accrual will affect *future* earnings up to the point where the error component corrects itself (the point where the accrual reverses), but is not expected to affect future earnings beyond that point. Consider, for example, the difference between the allowance for doubtful accounts and the actual cash collection realization: the error in the estimation, will affect earnings after the creation of the allowance, but not after the cash collection point. Therefore, our main hypothesis is that investors' pricing of reversing accruals can be different from that of originating accruals if they learn to recognize the reversal. Specifically, we expect mispricing of accrual originations, but no mispricing of accrual reversals. Investigating the pricing of the two types of extreme accruals, originations and reversals, allows for an in-depth examination of the fixation hypothesis and the possibility of investors' learning following the mispricing of the original accrual.

To test the earnings fixation hypothesis using the two types of accruals, we first develop and empirically validate a method that explicitly and ex-ante detects accrual originations and their reversals, using quarterly data. As any extreme accrual can be either an origination or a reversal of a past accrual, to differentiate between the two, we employ a three-step process fully explained in section 3 below. Briefly, in step one, we form a sample of extreme accruals by selecting firms that belong to the top two and bottom two accrual deciles. In step two, to designate a large positive (negative) accrual as an accrual origination, we sort net working capital (NWC) into deciles and require the NWC of firms with large positive (negative) accruals from step one to be in the top (bottom) three NWC deciles. The intuition for requiring step two to detect an origination is based on the property of accrual accounting, in which the recording of a large positive (negative) current accrual increases (decreases) NWC (the correlation between the change in NWC and current accruals is 0.63, untabulated). In step three, we detect accrual reversals by identifying the first time after the origination at which accruals are of comparable magnitude, but of opposite sign. In section 4, we validate our method by using account-level current accruals and demonstrate that accrual originations and accrual reversals are generally composed of the same accrual accounts, and are of similar magnitudes, but of opposite signs.

Our main results indicate that extreme originating accruals are mispriced, but reversing accruals are not, even though both are of similar absolute magnitude and are associated with low-persistence earnings. We find that the mispricing is present over the period from the accrual origination to its reversal, but not thereafter. Therefore, the accrual mispricing is fully corrected by the time the accruals reverse. We conclude that our findings are not uniformly consistent with the earnings fixation hypothesis because investors do not appear to fixate on earnings for firms with extreme accruals that are accrual reversals. Our evidence related to the pricing of reversing accruals is more consistent with investor learning: after mispricing the originated accruals, investors gradually learn and correct the mispricing by the time the accruals reverse. Based on our evidence, we suggest that it is too simplistic to assume that investors naively fixate on earnings, but rather a more complex mechanism involving investor learning is present in the pricing of extreme accruals.

A common conclusion from the literature on investor learning is that sophisticated investors make fewer behavioral errors and are able to learn to use information more efficiently than unsophisticated investors, e.g., Balsam, Bartov, and Marguardt (2002), Collins, Gong, and Hribar (2003), Zhang (2008). In line with this literature, we find that analysts revise their earnings forecasts downward (upward) more after observing the origination of positive (negative) accruals than after observing the reversal of positive (negative) accruals. These revision patterns are consistent with the different effects of accrual originations and accrual reversals on future earnings (i.e., accrual originations affecting future earnings, while reversals do not), and suggest that financial analysts distinguish between the two types of accruals when updating their earnings forecasts. Given strong evidence that investors react to those revisions (e.g., Gleason and Lee 2003, Hui and Yeung 2013), we conclude that analysts' earnings forecast revisions are one mechanism through which investors learn and correct any mispricing of accruals.

This study contributes to the literature in three ways. First, it adds to our understanding of the accrual anomaly. This is the first study to explicitly and ex-ante detect an accrual origination, trace it to its reversal, and demonstrate that the accrual anomaly ends by the time the accrual reverses. Second, it adds to the literature on investors' earnings fixation and investor learning by providing evidence that while investors misprice the originating accruals (consistent with the fixation hypothesis), they do not misprice the reversing accruals, a finding that is consistent with investor learning. Also, consistent with investor learning, the study demonstrates that sophisticated market participants such as financial analysts distinguish accrual originations from accrual reversals when updating their earnings forecasts, and therefore contribute to the price-correction of the initially mispriced accruals. Third, our method to distinguish accrual originations from accrual reversals is totally new and can be applied ex-ante, which should prove useful to researchers and investors. For example, earnings management studies that use extreme accruals as a proxy for earnings management can benefit from separating extreme accruals that are accrual originations (and are potentially used to manage earnings) from extreme accruals that are accrual reversals (and are unlikely means of earnings management). Thus, researchers can increase the power of earnings management tests.[3] Also, as we demonstrate in section 7, our method can be useful to investors for improving the accrual-based trading strategy by removing firms with extreme accruals that are accrual reversals from the trading portfolio.

Section 2 develops our hypotheses, section 3 describes our method for detecting accrual originations and accrual reversals, and section 4 presents the empirical validation of the method. Section 5 presents the empirical results from testing our hypotheses. Section 6 examines the revisions in financial analysts' earnings forecasts. Section 7 shows the improvements made to the accrual-based trading strategy, and section 8 concludes the study.

2. Hypothesis Development

Sloan (1996) and subsequent studies have shown that the accrual component of earnings is of lower persistence than that of the cash flow component. For extreme accrual firms, low persistence in accruals results in low persistence in earnings, which then will lead to the mispricing of extreme accruals, if investors naively fixate on earnings. Given our objective to study whether investors fixate on earnings for extreme accrual originations and extreme accrual reversals, we want to confirm first that both of these types of accruals are of low persistence and are associated with low persistence earnings. We expect extreme originating accruals to be of lower persistence than non-extreme accruals because the high (low) level of the NWC criterion that we impose acts as a ceiling (floor) and limits their persistence (managers' ability to sustain such extreme accruals is limited; Barton and Simko 2002). We also expect extreme reversing accruals to be of lower persistence than non-extreme accruals because they are also of large

[3] Dechow, Hutton, Kim, and Sloan (2012) demonstrate that incorporating accrual reversals into earnings management models significantly improves the power and specification of earnings management tests.

magnitude, and therefore are less likely to continue in future periods.[4] Thus, both extreme originating accruals and their reversals should be of lower persistence. Since estimation errors in originating accruals create transitory effects on earnings, and accruals and their estimation errors are positively correlated (Subramanyam 1996, Xie 2001), the earnings of firms with extreme accrual originations should have a larger transitory earnings component, and thus lower earnings persistence than firms with non-extreme accruals.[5] The earnings of firms with extreme reversing accruals have the same large component of transitory earnings as the earnings of firms at the origination, just of the opposite sign, and therefore should also be of lower persistence.[6] We summarize our expectations regarding the persistence of accruals and earnings for originating and reversing accruals as follows:

H1a: *The persistence of extreme accrual originations and extreme accrual reversals is lower than that of other accruals.*

H1b: *The earnings of firms with either extreme accrual originations or extreme accrual reversals are of lower persistence than those of other firms.*

If indeed the earnings of firms with extreme accruals are of low persistence and investors naively fixate on earnings, then both types of accruals, originations and reversals, should be followed by abnormal stock returns. When investors value accruals, they face uncertainty as to whether these accruals will be realized in cash. Thus, at the transaction level, when an extreme

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[4] A large inventory write-down is an example of an extreme reversing accrual that is unlikely to be repeated period after period, and thus, it is of low persistence.

[5] Sloan (1996) demonstrates that sorting firms on the absolute magnitude of accruals provides a simple and effective way of sorting on the *relative* magnitude of the accrual components of earnings. He further shows that the persistence of current earnings decreases in the magnitude of the accrual component of earnings.

[6] For illustration, consider a receivable of \$100 originated at time t with no allowance for doubtful accounts being recorded at time t. Suppose that \$10 out of the \$100 is determined uncollectible at time $t+i$ and earnings at time $t+i$ will include a \$10 write-down. Thus, earnings in the accrual origination quarter t would be *inflated* by \$10, earnings in the accrual reversal quarter $t+i$ would be *deflated* by \$10, while earnings in future quarters would no longer be affected by the original accrual estimation error.

accrual originates, there is uncertainty about the degree of future realization (all, some, or none). For example, in anticipation of future demand, a firm invests in inventory and records a large accrual. Investors observe the originating accrual, but they cannot be certain how much of the inventory will convert into sales, and how much will eventually be written down. However, a reversing accrual is sequential to the originating accrual, and therefore should lead to a resolution of the uncertainty related to the originating accrual.[7] A write-down of previously overstated inventory, for example, should resolve the uncertainty related to the inventory's intrinsic value, and investors can correct any existing mispricing. Therefore, the originating accrual may be mispriced, but the reversing accrual should be priced correctly. Furthermore, some studies provide evidence that the accrual anomaly is attributable to accounting distortions, including earnings management (Xie 2001, Beneish and Vargus 2002, Chan, Chan, Jegadeesh, and Lakonishok 2006), accruals of low reliability (Richardson, Sloan, Soliman, and Tuna 2005), and accrual estimation errors (Allen, Larson, and Sloan 2013). These types of distortions are more likely to relate to originating accruals than to reversing accruals. Since the effect of an originated accrual on future earnings may be hard to foresee, we expect accrual originations to be mispriced. However, an accrual reversal's lack of effect on future earnings should become apparent to investors, given that the previous uncertainty is resolved, and therefore, accrual reversals should not be further mispriced. Thus, we hypothesize as follows:

H2a: *Accruals that are accrual originations are negatively associated with future stock returns.*

H2b: *Accruals that are accrual reversals are not associated with future stock returns.*

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[7] The term "resolution of uncertainty" is related to a situation where investors learn new information about the ultimate payoff distribution. Uncertainty can be due to asset-specific or market-specific information (Kreps and Porteus 1978, Ross 1989, Epstein and Turnbull 1980, Feltham and Ohlson 1996, Feltham and Pae 2000).

If investors misprice only originating accruals, but not reversing accruals, then the repricing (price correction) of the originated accruals should end no later than their reversal point. DeFond and Park (2001) trace the price correction of abnormal accruals from 1 to 80 days after their occurrence, and find the process to be gradual. Therefore, we expect a gradual repricing of the originating accruals up to the point where these accruals reverse, but no further repricing beyond the reversal point. Consequently, our next hypothesis is as follows:

H2c: *The repricing of originated accruals is gradual and ends by the time accruals reverse.*

Hypotheses H2a, H2b, and H2c suggest that after mispricing the originated accruals, investors gradually learn and correct the mispricing by the time accruals reverse. Research in finance and accounting suggests that investors learn from experience and that sophisticated investors are more capable of understanding specific accounting information.[8] We examine the role of financial analysts in providing valuable information to investors relating to originating and reversing accruals. There is evidence in the literature that points to both the limitations and sophistication of financial analysts. Some studies show that analysts do not fully incorporate publicly available information into their forecasts and underreact to accounting information (e.g., Lys and Sohn 1990, Abarbanell 1991, Abarbanell and Bushee 1997, Bradshaw, Richardson, and Sloan 2001). For example, Bradshaw et al. (2001) find that analyst earnings forecasts do not fully anticipate the future earnings declines associated with high accruals.

However, other studies provide evidence that analysts' forecasts are quite sophisticated. Zhang (2008) studies the post-earnings-announcement drift and demonstrates that analysts facilitate market efficiency with their responsive forecast revisions. In terms of understanding

[8] See, for example, Feng and Seasholes (2005), Dhar and Zhu (2006), Seru, Shumway, and Stoffman (2010), and Korniotis and Kumar (2011).

accruals, Kim and Schroeder (1990) show that analysts are not misled by discretionary accruals that managers create to maximize their compensation. Burgstahler and Eames (2003) find that analysts anticipate earnings management to avoid small losses and small earnings decreases. Coles, Hertzel, and Kalpathy (2006) show that analysts seem to ignore low abnormal discretionary accruals in the period following announcements of cancellations of executive stock options up to the time the options are reissued. Furthermore, research on analysts' forecast revisions shows that the revisions reflect information in accruals beyond the information in earnings, suggesting that analysts pay attention to accruals and extract from them information regarding expected earnings (Barth and Hutton 2004). Most relevant to our study, DeFond and Park (2001) show that when actual earnings beat the forecasted earnings and contain income-increasing abnormal accruals, analysts revise their earnings forecasts upward *less* than in other cases. Similarly, when actual earnings come short of analysts' forecasts and contain income-increasing abnormal accruals, analysts revise earnings forecasts downward *more* than in other cases. Their results suggest that analysts take into consideration the reversing implications of abnormal accruals in revising future earnings forecasts.

Given the evidence of both sophistication and limitations, financial analysts may or may not revise their earnings forecasts after observing extreme accrual originations and reversals. We thus state our third hypothesis, based on the null of analysts' sophistication (they revise) with the alternative (not stated below) based on analysts' limitations (they do not revise):

H3: *Financial analysts distinguish between originating and reversing accruals and revise their earnings forecasts according to the differential implications that these accruals have on future earnings.*

Finally, Sloan (1996) and many subsequent studies (e.g., Collins et al. 2003, Shi and Zhang 2012) demonstrate that the trading strategy of taking long positions in the stocks of firms with low levels of accruals and short positions in the stocks of firms with high levels of accruals yields abnormal positive stock returns. If reversing accruals are not mispriced, they will not be associated with future abnormal returns. Thus, we expect that removing firms with extreme accrual reversals from the extreme accruals portfolio at the time of portfolio formation will increase returns on the accrual-based trading strategy. This leads to our last hypothesis:

H4: *Returns on the accrual-based trading strategy improve when firms with accrual reversals are removed from the extreme accruals trading portfolio.*

3. A method for detecting accrual originations and accrual reversals

To test our hypotheses, we first need to develop a way to ex-ante identify extreme firm-level accrual originations and their reversals. Distinguishing between originating and reversing accruals is a challenging task, and currently there is no study offering a clear way to do this.[9] In this paper, we propose a new method for explicitly detecting accrual originations and accrual reversals. Our method consists of three steps: in step one, we identify extreme accruals; in step two, we determine which of these extreme accruals represent originations; and in step three, we identify the reversals.

3.1 Detecting accrual originations

[9] In the appendix, we review other methods that have been proposed for detecting originating and reversing accruals, and we explain why our method represents an improvement.

We start (step one) by forming a sample of extreme accruals by selecting firms that belong to the top two and bottom two current accrual deciles in each quarter.[10] However, any extreme accrual at quarter *t* can be either a new accrual origination, or a reversal of a prior accrual. To distinguish between the two, we consider the balance sheet effect of accruals. Double-entry bookkeeping under accrual accounting implies that at the time when a positive (negative) current accrual is originated, net working capital (NWC) will be inflated (deflated), whereas at the time when the accrual reverses, NWC will go back to a normal, pre-inflated (pre-deflated) level (Barton and Simko 2002, Hirshleifer, Hou, Teoh, and Zhang 2004, Baber, Kang, and Li 2011). Therefore, we posit that an extreme positive accrual that brings NWC to a high level is likely to be a firm-level positive accrual origination, rather than a reversal of a past extreme negative accrual. By symmetry, an extreme negative accrual that brings NWC to a low level is likely to be a negative accrual origination rather than a reversal of a past extreme positive accrual. Therefore, in step two, to designate a large positive (negative) accrual as an accrual origination, we sort NWC (scaled by lagged total assets) into deciles, and require the NWC of firms with large positive (negative) accruals from step one to be in the top (bottom) three NWC deciles.

Some simple examples illustrate the intuition of the second step. Suppose a firm recorded large positive accruals because it built up inventory in anticipation of strong future demand. Since we measure current accruals at the firm level (to be consistent with the accrual anomaly literature), we cannot detect the buildup in inventory, and therefore, we cannot classify it as an accrual origination or an accrual reversal (e.g., a large decrease in accounts payable). Another

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[10] Current accruals are measured as the difference between income before extraordinary items and cash flows from continuous operations, adjusted for non-current accruals such as depreciation, the sale of long-term assets, goodwill impairment, etc., scaled by lagged total assets.

example is the case of "channel stuffing," in which a firm records a large accrual that increases revenues and receivables. We will observe large positive accruals, but since we do not directly observe channel stuffing, we cannot determine whether or not this is an origination of a new positive accrual or a reversal of an old negative accrual. However, if the firm also reports a high ending balance in NWC, it will be more likely that the accruals represent an origination due to inventory buildup or channel stuffing, rather than a reversal of past negative accruals. An example of an originating large negative accrual can be the recognition of a large increase in accounts payable which also significantly decreases NWC.

The implementation of the above two steps generates two accrual origination subsamples. One subsample contains firms with extreme positive accruals and high NWC, which we refer to as the "*positive accrual origination sample.*" The other subsample contains firms with extreme negative accruals and low NWC, which we refer to as the "*negative accrual origination sample.*" We refer to either or both of these two groups as the *"origination sample"* and to the quarter in which the positive/negative accruals are originated as the *"origination quarter."*[11]

3.2 Detecting accrual reversals

After identifying an accrual origination, we move to the third step of our procedure, which is to detect the accrual reversal. We define a quarter as the *"positive accrual reversal quarter"* when for the first time within the 20 quarters following a positive accrual origination, accruals for that quarter are negative, and their absolute magnitude is at least 50 percent that of

[11] We find that some firms have two or more consecutive quarters with accruals in the top two deciles and NWC in the top three deciles. We deal with these observations as follows: (a) when there are two, three, or four consecutive quarters with extreme positive (negative) accruals, we combine the accruals of these quarters into one "event," and the last quarter in the sequence is marked as the "positive (negative) accrual origination quarter"; (b) when two out of three, or three out of four consecutive quarters satisfy the origination criteria with no reversal in the interim quarter, we again combine the accruals of these quarters into one "event"; and (c) when there are five or more consecutive quarters with extreme accruals, we remove these firms from the sample because our identification procedure is potentially inappropriate for those unusual cases (only 1.2 percent of the originations).

the positive originating accruals.[12] Similarly, we define a quarter as the *"negative accrual reversal quarter"* when for the first time after the negative accrual origination, accruals for that quarter are positive, and their absolute magnitude is at least 50 percent that of the negative originating accrual.[13] Since there is the possibility of a gradual reversal over several quarters, we allow the 50 percent criterion to be reached within one, two, or three consecutive quarters, and define the last quarter as the "*reversal quarter.*"[14]

As a result of our method, we form and analyze in various tests three samples of positive and negative accruals: (a) *an accrual originations sample* that results from the application of steps one and two and thus includes all originations (even those for which we do not detect a reversal); (b) *an accrual reversals sample* that results from the application of all three steps; and (c) *an accrual originations with reversals sample* that represents accrual originations for which we were able to detect reversals; note that samples (b) and (c) contain the same firms, but at different quarters. By comparing accruals, earnings, and future returns for samples (a) and (b), we can directly test the fixation hypothesis.[15] By examining sample (c), we can study in-depth the process of accrual re-pricing from the time of their origination to the time of their reversal.

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[12] Although originating specific current accruals should reverse within 12 months, we allow for up to 20 quarters because a) at the firm level where all accruals accumulate, if firms intentionally postpone the firm-level reversal by originating new accruals, the reversal can happen over a period of longer than one year, and b) accruals relating to firm growth may persist for more than one year (Allen et al. 2013). Nonetheless, our results remain unchanged when we limit the reversal to taking place within 2 years.

[13] As an illustration, if accruals in the "positive accrual origination quarter" are 2 percent of the lagged total assets, then the first future quarter in which accruals are at least -1 percent of the total assets is the "positive accrual reversal quarter." We recognize that the 50 percent reversal cutoff is ad hoc, but at the same time, we argue that it is material. Also, as we report in Table 2, Panel C, when using a 50 percent reversal cutoff, the mean magnitude of the reversing accruals is similar to that of the originating accruals for both the positive and negative accruals reversal samples. In a robustness test, we use a 75 percent cutoff, and the results (from a smaller sample) are qualitatively similar.

[14] We could have allowed the reversal to take place over more than three quarters in order to capture more of the gradual reversals. However, the vast majority of reversals occur over one quarter (81.4 percent and 84.9 percent for the positive and negative accrual origination samples, respectively, untabulated). This clearly limits the benefit of allowing the reversal to take place over many quarters, but can lead to the incorrect detection of reversals. We also repeated all tests using only observations with reversals within one quarter, and the results we report did not change.

[15] Also, by using the *accrual originations sample* rather than the *accrual originations with reversals sample* in the return tests, we avoid the look-ahead problem.

Finally, we define the "*reversal horizon"* as the time period between the origination quarter and the reversal quarter.[16] Figure 1 illustrates the concepts of the "*positive accrual origination quarter,*" "*positive accrual reversal quarter,*" and "*reversal horizon*."

[INSERT FIGURE 1 ABOUT HERE]

In the next section, we present the specifics of our sample formation and conduct tests to provide construct validity for the above method.

4. Sample formation and validation of the accrual originations and reversal method

4.1 Sample formation

Our empirical analysis is based on a sample of all nonfinancial US firms with a minimum stock price of $2 and the required accounting data in the Compustat quarterly files, spanning the fiscal years 1989 through 2008. The sample starts in 1989 because we follow Collins and Hribar's (2002) suggestion to measure current accruals from the statement of cash flows, which became available starting in 1988, following SFAS No. 95. The sample ends in 2008 because we allow the reversal to occur in the following 20 quarters. We employ quarterly accounting data, given our objective to detect the origination and reversal of accruals as soon as and as precisely as possible. Stock returns are obtained from the CRSP daily and monthly files. Analysts' forecast data are from IBES.

4.2 Validation of the identification of the accrual originations and reversals method

The accrual anomaly literature has consistently used firm-level data to document and investigate the anomaly. Consistent with this approach, our method also uses firm-level current

[16] For illustration, if accruals are 2 percent of the lagged total assets in Q1 2002, and are -1 percent in Q3 2003, then the reversal horizon is 6 quarters. As another example, if accruals are 2 percent of the lagged total assets in Q1 2002, and are -0.7 percent in Q3 2003 and -0.3 percent in Q4 2003, then the reversal horizon is 7 quarters.

accruals to identify accrual originations and accrual reversals. However, our method is new to the literature, and we therefore deem it necessary to demonstrate that it is a valid construct for the identification of originations and reversals. To do so, we conduct various accrual analyses at the account level and provide evidence on the validity of our method.[17]

At the account level, we would expect *positive* accrual originations and their reversals to be mainly related to current asset accruals (accounts receivable and inventory), while we would expect *negative* accrual originations and their reversals to be mainly related to current liability accruals (accounts payable, taxes payable, and other current liabilities). In other words, if the NWC condition (step two) helps in identifying accrual originations, positive (negative) accrual originations should be dominated by current assets (liabilities). On the other hand, for positive accruals that our method does not classify as positive originations, current asset accruals should not dominate current liability accruals; similarly, for negative accruals not classified as negative originations, current liability accruals should not dominate current asset accruals. Such findings will highlight the importance of the NWC condition in detecting accrual originations.

Our validation exercise starts with an analysis of the following four major current accrual accounts using valid Compustat quarterly data for firms in our sample: (1) *AR* is the increase in accounts receivable (RECCHY); (2) *INV* is the increase in inventories (INVCHY); (3) *AP* is the decrease in accounts payable and accrued liabilities (APALCHY); and (4) *ALOTH* is the decrease in other assets and liabilities (AOLOCHY).[18,19] All variables are measured from the

[17] The validation analysis lengthens the paper but since we view the new method as an important contribution of the study, we include it in the text.
[18] While the other assets and liabilities account captures changes in both assets and liabilities, Compustat treats this account as a net liability. This is evident by the fact that it is measured as a decrease (increase) in the cash flows related to this accounts, similarly to the way accounts payable and tax liabilities are measured. Accounts receivable and inventory, on the other hand, are measured as increases (decreases) in the cash flows related to these accounts.

statement of cash flows, scaled by lagged total assets, and because of the presence of a few extreme values, each variable is winsorized at the top and bottom 0.5 percent.[20] Next, in every quarter, each of these four accounts is sorted into deciles, with the top decile having the highest positive value. We then analyze the account composition of two sub-samples: 1) the sub-sample of "positive accrual originations with reversals," i.e., extreme positive accruals satisfying the NWC condition; and 2) the sub-sample of extreme positive accruals that do not satisfy the NWC condition, and therefore, are not classified as accrual originations. We repeat the same type of analysis for the sub-samples of "negative accrual originations with reversals" and of extreme negative accruals not classified as accrual originations.

Table 1, Panels A and B report for each of the four accounts, the frequencies of being in the top (bottom) two deciles and the magnitudes of extreme positive (extreme negative) accruals, classified and not classified by our method as originations. The first column of Panel A shows that for *positive* accrual originations, accounts receivable and inventory accruals have the highest frequencies (0.551 and 0.462, respectively). The last row in this panel shows that almost 80 percent of the positive accrual originations have at least one of the current asset accruals (*AR* or *INV*) in the top two deciles. The second and third columns show that with respect to magnitude, by far, accounts receivable are the largest accruals (mean 0.0460, median 0.0251) for observations classified as positive accrual originations, followed by inventory accruals (mean

[19] We follow Collins et al. (2014) and code missing values of RECCHY, INVCHY, and APALCHY, as zero if there is a non-missing value of AOLOCHY. Conversely, if AOLOCHY is missing, but the other three items are not, then we code AOLOCHY as zero.

[20] We also examined two other current accrual accounts, namely deferred revenue and income taxes payable. Data on deferred revenues were available for only 23.9 percent of the observations, of which, 68.4 percent had values of zero. Overall, we found that only 189 negative accrual originations and fewer than 50 reversals in our sample are driven by significant negative deferred revenues. The availability of tax payable accruals was more reasonable, but the amounts are rather immaterial: the unsigned mean value of taxes payable (*TXACHY*) is 0.0023, which is markedly smaller than the mean values of the other four variables (0.0226 for *AR*, 0.0131 for *INV*, 0.0182 for *AP*, and 0.0190 for *ALOTH*). Therefore, we do not consider these accounts in our account analysis. Nonetheless, when we combined them with *ALOTH* and repeated the analyses, we obtained very similar results to those reported.

0.0177, median 0.0060). Thus, as expected, asset-related accruals dominate the positive accrual originations sample. The four rightmost columns of Panel A report the results for the extreme positive accruals *not* identified as originations by our method. Both frequencies and magnitudes show that the positive extreme accruals not classified as originations are no longer dominated by *AR* and *INV*. The difference in frequencies of observations with *AR* or *INV* at the top two deciles (last row) between two samples (0.787 vs. 0.509) is highly significant (t-value of 47.40, untabulated), indicating that the identification of accrual originations using the NWC condition is systematic.

[INSERT TABLE 1 ABOUT HERE]

In the first three columns of Panel B, we report the results from similar analyses for extreme negative accruals classified as originations. In this sample, the liability accounts have the highest frequencies (0.378 for AP and 0.466 for *ALOTH*) and magnitudes (means of -0.0165 and -0.0184 for *AP* and *ALOTH*, respectively). Also, the last row of Panel B shows that 74.2 percent of the negative accrual originations have at least one of the current liability accruals (*AP* or *ALOTH*) in the bottom two deciles. For extreme negative accruals *not* classified as originations, the four rightmost columns of Panel B show that the liability accounts have frequencies (0.288 for *AP* and 0.393 for *ALOTH*) and magnitudes (means of -0.0083 and -0.0158 for *AP* and *ALOTH*, respectively) that do not dominate the asset accounts. Furthermore, the difference in the frequencies of *AP* or *ALOTH* (last row) between the two samples (0.742 vs. 0.604) is highly significant (t-value of 22.47, untabulated) suggesting again that the identification of negative accrual originations using the NWC condition is systematic. Overall, the results from Panels A and B demonstrate that the use of NWC to identify accrual originations helps exclude extreme accruals that are less likely to be accrual originations for both positive and negative extreme accrual samples, thus lowering the occurrence of a Type II error.

We complement the analysis of the originations with an examination of the specific accrual accounts at reversal. If our method does a reasonable job at identifying reversals, we would expect the accounts that dominated the originations to also dominate the reversals.[21] Panels C and D of Table 1 report the frequencies of each accrual account at the bottom (top) two accrual deciles and their magnitudes *at the reversal* of positive (negative) accruals. We see that the frequencies and magnitudes are strikingly similar to those at the origination, reported in Panels A and B. For example, *AR* and *INV,* which had the highest frequencies at the origination (0.551 and 0.462 in Panel A), have the highest frequencies also at the reversal (0.556 and 0.535 in Panel C); and for 80 percent of the reversals (last row), at least one of those accounts has accruals that are at the bottom two deciles. In terms of magnitude, Panel C again confirms that *AR* and *INV* dominate with mean values of -0.0328 and -0.0197. The results in Panel D show analogous patterns at the reversal of negative accruals. Overall, the results in Panels C and D provide evidence that our method does a good job at identifying positive and negative accrual reversals.

A second validation test has the objective to rule out the possibility that the negative accrual origination sample includes many cases of firms downsizing. Such firms may have large negative accruals that are due to inventory and/or other current asset write-downs. For such firms, NWC can also be low, and as a result, we may misclassify a positive accrual reversal as a

[21] We do not expect a perfect articulation between the originating and reversing accounts. For example, in the origination quarter, we detect a large increase in accounts receivable. However, in a quarter *between* the origination quarter and the reversal quarter, the company reverses accounts receivable and also records a large increase in inventory. Then, in the reversal quarter, we will not observe a large negative accrual relating to the reversal of accounts receivable; instead, we will observe the reversal of inventory. Nonetheless, the reversal horizon for the vast majority of the observations is no more than four quarters, and therefore, while the relationships can be weakened, they should still exist.

negative accrual origination (Type II error). This analysis is limited to the period 2000-2008, because the items we examine are not available on Compustat for earlier years. We follow Elliott and Shaw (1988) in analyzing pre-tax asset write-downs scaled by lagged total assets with a magnitude of 1 percent or higher. We find that the frequency of a large asset write-down at the origination of negative accruals is quite low, only 2.0 percent. We also check in a similar way the presence of large restructuring charges because this can also be a sign of downsizing, and we find their frequency to be only 1.9 percent. The frequency of having at least one of these two events is 3.5 percent.[22] In terms of magnitude, mean (scaled) asset write-downs and restructuring costs also appear quite low (-0.001 and -0.0004, respectively). Therefore, we conclude that firm downsizing does not seem to have a major impact on our analysis.

In a third validation test, we analyze a sample of annual hand-collected inventory write-downs over the years 2001-2004, which was generously given to us by Allen et al. (2013). An inventory write-down is a negative accrual that reverses a past positive accrual. If our method works well, it should classify a current asset write-down as a reversal of a positive accrual rather than as an origination of a negative accrual. Given that these data identify the write-down year, we examine whether in that year our method marks more positive accrual reversals (correct classification) than negative accrual originations (wrong classification). We find that the inventory write-down years had 320 cases classified by our method as positive accrual reversals, and only 82 cases were classified as negative accrual originations (78 percent vs. 22 percent). Since our method uses extreme accruals, we repeat the analysis, focusing on the more significant inventory write-downs by examining the above-the-median scaled write-downs. For these write-downs, the difference in the identification between the two groups is even larger: 173 positive

[22] Even if we set the threshold to 0.25 percent because of the use of quarterly data, the frequency of having either an asset write-down or a restructuring cost that exceeds 0.25 percent of lagged total assets is still only 5.5 percent.

accrual reversals and 35 negative accrual originations (83 percent vs. 17 percent). Thus, our method correctly classifies the vast majority of significant inventory write-downs as reversals of positive accruals.

Overall, although our three-step method can be subject to some misclassification error, the facts that we (1) base our method on fundamental accrual accounting principles and empirical findings in prior studies; (2) provide construct validity evidence for the benefit of conditioning on NWC using specific accrual accounts; (3) find results related to the accrual anomaly that are consistent with our hypotheses; and (4) demonstrate that our method can be applied ex-ante to significantly improve returns to the accrual-based trading strategy (section 7), give us assurance that our method is reliable.

5. Accrual originations, accrual reversals and the accrual anomaly

5.1 Descriptive statistics

Following the first two steps of our procedure, described in subsection 3.1, we first select extreme accrual firms that meet our criteria for accrual origination. This results in a sample of 15,619 positive accrual originations, and 11,928 negative accrual originations. Next, for each accrual origination, we follow the third step of our procedure presented in subsection 3.2, and search for the accrual reversal up to 20 quarters after the accrual origination. Using this procedure, we are able to detect positive accrual reversals for 8,974 positive accrual originations (62.0 percent), and negative accrual reversals for 7,670 negative accrual originations (64.3 percent).[23]

[23] Both the positive and negative accrual samples have diverse 2-digit SIC industry representations. Industries with the largest representation in the positive accrual origination sample are 36 (Electronic and Other Electrical Equipment), 38 (Measuring, Analyzing, and Controlling Instruments), 35 (Industrial and Commercial Machinery),

We see three potential reasons for not detecting reversals for approximately one third of the originated accruals. First, accrual reversals could happen gradually, and in this case, our procedure would not detect all of them. Second, originated accruals can be associated with economic growth, which can persist for more than a 20-quarter horizon that we allow.[24] Finally, we cannot rule out the possibility that we falsely identify some of the accrual originations.

Table 2, Panel A reports information on the reversal horizon. The mean (median) reversal horizon is 2.32 (2.00) quarters for the positive accrual sample, and 2.19 (1.00) quarters for the negative accrual sample. The panel also shows a fast reversal pattern, with 89.8 percent (91.1 percent) of the positive (negative) accruals reversing in the first year after the origination. This is consistent with the current accruals' nature, which should reverse within one year.

[INSERT TABLE 2 ABOUT HERE]

Panel B of Table 2 reports the frequencies of originations and reversals by fiscal quarter. There are two findings worth mentioning. First, originations are less likely to occur in the fourth fiscal quarter than in any other quarter (18.7 percent and 20.4 percent for the positive and negative accrual originations, respectively). Second, the positive accrual reversals are much more likely to occur in the fourth fiscal quarter than in any other quarter (45.4 percent), while the negative accrual reversals are more uniformly distributed across quarters. Since the fourth quarter is the only period in which financial statements are audited, these results suggest that auditors are effective in limiting the origination of both positive and negative extreme accruals, and in forcing the reversal of extreme positive accruals.

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and 73 (Business Services). Industries 35, 36, and 38 are overrepresented, while industry 73 is underrepresented, relative to the Compustat population. Industries with the largest representation in the negative accrual origination sample are 73 (Business Services), 28 (Chemical and Allied Products), and 13 (Oil and Gas Extraction), which are all overrepresented relative to the Compustat population. Other industries have minor representation (5.8 percent at most). Overall, there is no obvious industry clustering in either sample (a table is available upon request).

[24] In firms with growing sales, the purchases of new inventory will be larger than the cost of the inventory sold, making the reversal of the inventory accrual undetectable until inventory levels start to decline.

Panel C of Table 2 reports the mean values for the key variables of the positive accrual originations with reversals and negative accrual originations with reversals samples, and tests the differences in means between originations and reversals. By construction, the positive accrual sample has large and positive current accruals in the origination quarter (mean *CAC* = 0.074), and negative accruals of almost the same magnitude in the reversal quarter (mean *CAC* = -0.08); the opposite is true for the negative accrual sample (mean *CAC* = -0.054 and 0.062 for negative originations and reversals, respectively). Ideally, in such a univariate analysis, we would like to see only *CAC* and *NWC* differences between the origination and reversal samples, and the differences for all other variables to be insignificant, as both samples contain the same firms at different points in time. However, accruals affect many of these key variables, and therefore, it is not surprising that all mean differences (the two rightmost columns), except for total assets and beta, are significant. For example, accruals are well known for being negatively correlated with cash flows from operations (e.g., Dechow 1994, Dechow, Kothari, and Watts 1998). Therefore, it is not surprising that *CFO* is lower at the origination of positive accruals than at their reversal, and higher at the origination of negative accruals than at their reversal. Also, since accruals contain estimation errors (Allen et al. 2013), which would affect earnings, it is not surprising that *ROA* is higher at the origination of positive accruals than at their reversal (1.24 percent vs. -0.62 percent) because the estimation errors in the positive originating accruals inflate earnings, while at reversal, they deflate earnings. For the same reason, *ROA* is lower at the origination of negative accruals than at their reversal.

To rule out the possibility that some of these differences drive our results, we ran sensitivity analyses. Specifically, we removed origination and reversal observations when the difference between the origination and reversal values of *BM*, *LEV*, *SALES*, *GrLTNOA*, and

GrCSALE was larger than 30 percent, and we repeated the main tests in the study. Overall, our inferences remained the same, and therefore, the differences between each of these variables' values at origination and reversal do not seem to drive our main results.

5.2 Accrual persistence and earning persistence for accrual originations and accrual reversals

Hypotheses H1a and H1b predict that both accrual originations and accrual reversals will have lower accrual persistence and lower earnings persistence, respectively. We start by testing Hypothesis H1a related to accrual persistence. Using 262,609 firm-quarter observations over our sample period 1989 to 2008, we estimate the following model:[25]

$$CAC_{q+1\ to\ q+4} = \alpha_0 + \alpha_1 CAC_q + \alpha_2 CAC_q * D\_orig + \alpha_3 CAC_q * D\_rev + \varepsilon_{q+1\ to\ q+4} \quad (1)$$

This model regresses future current accruals, $CAC_{q+1\ to\ q+4}$, measured as the sum of current accruals in the following four quarters, on current accruals, $CAC_{q,}$ the interaction of CAC_q with *D_orig,* an indicator variable taking the value of 1 for extreme accruals that are classified by our procedure as originations (positive or negative) and 0 otherwise, and the interaction of CAC_q with *D_rev,* an indicator variable that is set to 1 for accruals that are classified as extreme accrual reversals and to 0 otherwise. We report the results in Panel A of Table 3. The coefficient on CAC_q, α_1, which captures the persistence of accruals that are neither originations nor reversals, is positive (0.387) and significant, indicating positive persistence for quarterly accruals, in general. The coefficient on CAC_q*D_orig* is negative, and the sum of coefficients α_1 and a_2 is negative, (0.387-0.492=-0.105), indicating that the persistence of accrual originations is

25 In this test and all following multivariate tests, except for equation (7), we rely on White standard errors, which are robust to time- and industry-series cluster correlations (Petersen 2009), and we winsorize all continuous variables in the top and bottom 1 percent.

negative. The results further show that reversing accruals also have negative persistence, which is very similar in magnitude to that of the originating accruals, (0.387-0.525=-0.138). In sum, the results from Panel A of Table 3 are consistent with Hypothesis H1a, as they show that both accrual originations and reversals are of lower persistence.

[INSERT TABLE 3 ABOUT HERE]

Next, we test Hypothesis H1b regarding the earnings persistence of accrual originations and accrual reversals. Specifically, using 294,852 firm-quarter observations over our sample period, we estimate the following model:

$$EAR_{q+1\,to\,q+4} = \alpha_0 + \alpha_1 EAR_q + \alpha_2 EAR_q * D\_orig + \alpha_3 EAR_q * D\_orig\_rev + \alpha_4 EAR_q * D\_rev + \varepsilon_{q+1\,to\,q+4} \quad (2)$$

EAR_q are quarterly earnings before extraordinary items, scaled by lagged total assets. In model (2) we regress future earnings, $EAR_{q+1\ to\ q+4}$, measured as the sum of earnings in the following four quarters, on current earnings, EAR_q, on the interaction of EAR_q with *D_orig*, the indicator variable for accrual origination, on the interaction of EAR_q with *D_orig_rev*, an indicator variable that is set to 1 for accrual originations with reversals and to 0 otherwise, and on the interaction of EAR_q with *D_rev*, the indicator variable for accrual reversal. We report the results in Panel B of Table 3. The coefficient on EAR_q is positive (3.422) and significant, indicating positive persistence for quarterly earnings in general. The coefficient on EAR_q*D_orig, which now captures the relative earnings persistence of accrual originations for which our method does not find a reversal, is negative (-0.277) and significant. This indicates that those originations have lower earnings persistence than that of firms that are neither accrual originations, nor accrual reversals. The coefficient on EAR_q*D_orig_rev, which captures the incremental earnings persistence of accrual originations for which our method finds reversals, is negative (-0.313) and significant. This indicates that the earnings persistence for accrual originations with reversals is even lower (-0.277-0.313=-0.590). Finally, the coefficient on EAR_q*D_rev is negative (-0.581) and significant, consistent with earnings at the reversal being also of lower persistence, and in fact very similar earnings persistence to that of accrual originations (-0.590). Overall, the results in Table 3, Panel B provide support for our Hypothesis H1b, in that both accrual origination and accrual reversal firms have lower earnings persistence.

5.3 Extreme accrual originations, extreme accrual reversals, and future stock returns

In the previous subsection, we demonstrated that both accrual origination and accrual reversal firms have lower accrual and earnings persistence. Therefore, if investors naively fixate on earnings, they will misprice both accrual origination and accrual reversal firms because for both, the accrual component of earnings is of low persistence. In this subsection, we test the mispricing of extreme accrual originations (H2a) and accrual reversals (H2b) to find out whether earnings fixation provides a complete explanation for the accrual anomaly.

We first test for an association between the originating accruals and 1-, 2-, and 4-quarter future abnormal stock returns, using the following model:

$$\begin{aligned} ABRET_{oq+1\,to\,oq+j} &= \alpha_0 + \alpha_1 CAC_{oq} + \alpha_2 GrLTNOA_{oq} + \alpha_3 NOA_{oq} + \alpha_4 GrCSALE_{oq} \\ &+ \alpha_5 SHRCHG_{oq} + \alpha_6 Beta_{oq} + \alpha_7 \log MVE_{oq} + \alpha_8 \log BM_{oq} + \alpha_9 MOM_{oq} + \varepsilon_{oq+1\,to\,oq+j} \end{aligned} \quad (3)$$

In (3), the dependent variable $ABRET_{oq+1\ to\ oq+j}$ is the compounded buy-and-hold 1-, 2-, and 4-quarter size-adjusted stock returns (j=1, 2, and 4) subsequent to the accrual origination. CAC_{oq} is the current accruals at the origination quarter *oq*. We expect α_1 to be significantly negative if investors misprice the originating accruals. We include in the model other explanatory variables, which are also measured as of the originating quarter. Thus, we include net operating assets (NOA), NOA_{oq}, to control for the NOA anomaly (the negative association between *NOA* and future returns) documented in Hirshleifer et al. (2004). This is important because NWC (used in our method to detect accrual originations) positively correlates with

NOA, and therefore, CAC_{oq} in (3) is likely to pick the effects of both the accrual and NOA anomalies unless we control for NOA. In addition, since the growth anomaly (the negative association between asset growth and future returns) is a major competing explanation for the accrual anomaly, we include two growth-related variables in all of our multivariate return analyses. One growth variable relates to long-term growth and is motivated by evidence in Fairfield et al. (2003). Thus, we include $GrLTNOA_{oq}$, which represents growth in long-term net operating assets, measured as the change in net operating assets minus the change in current accruals scaled by the beginning of quarter total assets. However, this variable is unlikely to be sufficient in controlling for growth effects because Zhang (2007) shows that other growth-related variables co-vary with current accruals. Thus, we also include a growth variable motivated by evidence in Zhang (2007), the percentage seasonal change in quarterly cash sales, $GrCSALE_{oq}$. This is an appealing growth variable because it captures growth in a key cash variable, and it is also free of any accrual estimation errors.[26] We also control for the presence of the net stock issues anomaly by including in the model $SHRCHG_{oq}$, the change in the logarithm of split-adjusted shares outstanding in the 12 months prior to the end of quarter *oq*. The remaining variables in (3) are the four well-known risk factors: beta, market size, book-to-market ratio, and return momentum defined as follows: $Beta_{oq}$ is the firm-specific beta, measured as the coefficient from regressing monthly raw returns on the market equal-weight monthly returns index over the 36 months prior to the end of quarter *oq*;[27] $logMVE_{oq}$ is the logarithm of the market value of equity at the end of quarter *oq*; $logBM_{oq}$ is the logarithm of the book-to-market ratio, measured as the ratio of the book value of equity to the market value of equity at the end of quarter *oq*; and

[26] Another major variable used by Zhang (2007) is the percentage growth in the number of employees. However, this figure is unavailable on a quarterly basis.
[27] We require a minimum of 15 monthly returns for the estimation of *Beta*.

MOM_{oq} is the return momentum, measured as the raw stock return in the six months prior to the end of quarter *oq*.[28,29]

Table 4, Panel A reports the results from estimating equation (3), using 22,340 firm-quarter observations of accrual originations. Consistent with Hypothesis H2a, in all three return horizons, CAC_{oq} obtains a significantly negative coefficient α_1 (-0.090, -0.166, -0.330), indicating that investors misprice the originating accruals. In addition, as the horizon increases, α_1 becomes more negative as more and more originating accruals reverse (consistent with the finding reported in Table 2, Panel A that approximately 90 percent of the originations reverse within the following four quarters). In all three return horizons, NOA_{oq} also obtains a significantly negative coefficient consistent with the NOA anomaly. Among the control variables, all are strongly significant in all three periods, except for $GrLTNOA_{oq}$, which is weakly significant only over the 2-quarter period and $GrCSALE_{oq}$, which is significant only over the 4-quarter period.

[INSERT TABLE 4 ABOUT HERE]

Next, we test the association between the reversing accruals and 1-, 2-, and 4-quarter abnormal stock returns. The model is identical to the one we use to examine the mispricing of the originating accruals (equation 3), except that the accruals and the other explanatory variables are

[28] As a robustness check, in regression (3) and subsequent return regressions, we also included the change in investments because Wu et al. (2010) find this variable to be associated with the accrual anomaly. Overall, our results are insensitive to this specification. Two issues associated with this variable are: (1) missing values, which lead to smaller samples; and (2) a high correlation with *GrLTNOA* and *SHRCHG,* which renders the investment variable insignificant or only weakly significant. Thus, we do not report results from that model specification.

[29] In this and all following return regressions, we measure the risk variables as of the beginning of the return period. When a company delists during the return period, we include the delisting return in the abnormal return calculation, and reinvest the proceeds in a zero abnormal return portfolio. If the monthly delisting return is missing, then we use the delisting return from the daily returns file. If the delisting return is also missing from the daily returns file, we use the average delisting return for the relevant category (e.g., average merger and acquisition delisting return for firms delisted due to mergers and acquisitions, etc.).

measured at the accrual reversal quarter, *rq*, and abnormal returns are measured at the post-reversal periods. The model is as follows:

$$ABRET_{rq+1\ to\ rq+j} = \alpha_0 + \alpha_1 CAC_{rq} + \alpha_2 GrLTNOA_{rq} + \alpha_3 NOA_{rq} + \alpha_4 GrCSALE_{rq} + \alpha_5 SHRCHG_{rq} + \alpha_6 Beta_{rq} + \alpha_7 \log MVE_{rq} + \alpha_8 \log BM_{rq} + \alpha_9 MOM_{rq} + \varepsilon_{rq+1\ to\ rq+j} \quad (4)$$

In (4), $ABRET_{rq+1\ to\ rq+j}$ (j=1, 2, and 4) is the size-adjusted return over 1-, 2-, and 4-quarter periods after the accrual reversal quarter, *rq*. Table 4, Panel B reports the results from estimating equation (4), using 14,703 firm-quarter observations for which we find a reversal. Consistent with hypothesis H2b that the reversing accruals are not mispriced, the coefficient on CAC_{rq} is insignificant in all three post-reversal periods and has values very close to zero. Furthermore, coefficient α_1 in Panel B is much smaller than that in Panel A (one-fifth at most), although both coefficients measure the association of extreme accruals with future returns. For the control variables, there is evidence (lack of evidence) for the presence of the net stock issues anomaly (NOA and growth anomaly) in the data, while the risk variables are mostly significant.

Collectively, the results from Tables 3 and 4 demonstrate that while both accrual originations and accrual reversals are associated with low-persistence accruals and earnings, only the originating accruals are associated with future abnormal stock returns. Therefore, we conclude that our findings are not uniformly consistent with the earnings fixation hypothesis, as we find that investors fixate only on the earnings of firms with extreme accruals that are accrual originations. It is important to note that this conclusion is different from that of prior studies claiming that earnings fixation is not the cause of the accrual anomaly (e.g., Ali, Hwang, and Trombley 2000, Kothari, Loutskina, and Nikolaev 2006, Zach 2006). Our explanation is that earnings fixation is still the cause of the anomaly, but is limited to the originating accruals.

5.4 Repricing of the originated accruals

In the previous section, we demonstrated that only originating accruals are mispriced. To further test whether the repricing of originated accruals is gradual and ends by the time accruals reverse (Hypothesis H2c), we examine the mispricing of the originating accruals over the reversal horizon, and over the periods subsequent to the reversal.

We start by examining the repricing of the originating accruals over the following three periods: (a) the reversal horizon; (b) the reversal quarter (starting two days after the earnings announcement in the quarter prior to the reversal and ending one day after the reversal quarter's earnings announcement); and (c) the three trading days surrounding the earnings announcement for the reversal quarter. Panel A of Table 5 reports the univariate return results. For the positive accrual originations with reversals sample, abnormal returns are negative and significant over the reversal horizon and for the reversal quarter (-6.63 percent and -1.80 percent, respectively), but positive and significant for the three-day period around the reversal quarter's earnings announcement (0.24 percent). In all three periods, abnormal returns for the negative accrual origination sample are positive and significant (4.64 percent, 2.92 percent, and 0.25 percent, respectively). These results show that although accruals repricing is present during the reversal quarter, a large portion of the price correction (approximately 73 percent and 37 percent for the positive and negative accrual originations, respectively) takes place prior to the reversal quarter. This is consistent with a gradual price correction over the reversal horizon and with investor learning, rather than with an instantaneous price correction at the earnings announcement in the reversal quarter.

[INSERT TABLE 5 ABOUT HERE]

We complement the univariate analysis with multivariate tests. It is important to note that the return test over the three aforementioned periods is an ex-post test because we look ahead to detect the reversal of the originated accruals. To account for the ex-post nature of the test, we include in the regression the contemporaneous change in earnings, so that the repricing of originating accruals over the various horizons is conditional on newly available information. Because earnings at the reversal quarter are affected by the reversal of the originated accruals, to have a clean test on the association between the originated accruals and future stock returns, we use a two-stage approach. Specifically, in the first stage, we generate two seasonal earnings change variables: one for the reversal quarter (*rq*), ΔEAR_{rq}, and one for the reversal horizon (*rh*), ΔEAR_{rh}, which are orthogonal to the originated accruals, CAC_{oq}. The first stage regression is:

$$\Delta EAR_{rq/rh} = \alpha_0 + \alpha_1 CAC_{oq} + \alpha_2 GrLTNOA_{oq} + \alpha_3 GrCSALE_{oq} + \varepsilon_{rq/rh} \qquad (5)$$

In (5), the independent variables CAC_{oq}, $GrLTNOA_{oq}$ and $GrCSALE_{oq}$ are measured at the origination quarter, *oq*. We include in (5) the long-term growth in NOA ($GrLTNOA_{oq}$) and the percentage seasonal quarterly cash sales change ($GrCSALE_{oq}$) because similar to accruals, growth can also reverse. $\Delta \hat{EAR}_{rq/rh}$ is the fitted value from the estimation of (5). Thus, the difference $\Delta EAR_{rq/rh} - \Delta \hat{EAR}_{rq/rh}$ represents the reversal quarter's (reversal horizon's) earnings change that is not affected by the origination quarter's accruals (or by growth).

In the second stage, we test the association between originating accruals, CAC_{oq}, and abnormal returns over three return periods: (1) the three days surrounding the reversal quarter's earnings announcement, $ABRET_{3d}$, (2) the reversal quarter, $ABRET_{rq}$, and (3) the reversal horizon, $ABRET_{rh}$. We also include in the model $\Delta EAR_{rq/rh} - \Delta \hat{EAR}_{rq/rh}$, CAC_{oq}, NOA_{oq}, $GrLTNOA_{oq}$, $GrCSALE_{oq}$, $SHRCHQ_{oq}$, and the four risk variables all measured at the beginning of the return period ($Beta_{rq/rh}$, $logMVE_{rq/rh}$, $logBM_{rq/rh}$ *and* $MOM_{rq/rh}$), as follows:

$$ABRET_{3d/rq/rh} = \beta_0 + \beta_1(\Delta EAR_{rq/rh} - \Delta\hat{EAR}_{rq/rh}) + \beta_2 CAC_{oq} + \beta_3 NOA_{oq} + \beta_4 GrLTNOA_{oq}$$
$$+ \beta_5 GrCSALE_{oq} + \beta_6 SHRCHG_{oq} + \beta_7 Beta_{rq/rh} + \beta_8 \log MVE_{rq/rh} + \beta_9 \log BM_{rq/rh} \quad (6)$$
$$+ \beta_{10} MOM_{rq/rh} + \beta_{11} \mathrm{Re}vHORZ_{rh} + \mu_{3d/rq/rh}$$

For the return over the reversal horizon, we add to the model $RevHORZ_{rh}$, the number of quarters from the accrual origination until the accrual reversal. We do this because firms have different reversal horizons, and we want to account for a possible horizon-length-related effect. All other variables are defined as in section 4.3. A negative and significant β_2 will indicate that the price reaction in the considered time period is negatively associated with the accruals of the origination quarter, and will be consistent with the originated accrual mispricing.

Results from the estimation of regressions (5) and (6) are reported in Table 5, Panel B. The first-stage regression shows that the originated accruals are negatively and significantly associated with the earnings change in the reversal quarter and over the reversal horizon (CAC_{oq} coefficients of -0.136 and -0.235, respectively). The negative association is consistent with the reversal of accruals affecting reported earnings through the reversal of estimation errors and reinforces the importance of the two-stage approach. Long-term growth ($GrLTNOA_{oq}$) is also negatively and significantly associated with the change in earnings and is much more important than growth in cash sales ($GrCSALE_{oq}$). In the second-stage regressions, the variable of interest, CAC_{oq}, is negatively and significantly associated with abnormal returns for all three time periods, (coefficients of -0.028, -0.275, and -0.622 for the three days around the earnings announcement, the reversal quarter, and the reversal horizon, respectively).

These results point, once again, to a gradual correction of the anomaly up to the reversal quarter's earnings announcement, as the coefficient increases with the time window. Of the other explanatory variables, ($\Delta EAR_{rq/rh}$-$\Delta\hat{EAR}_{rq/rh}$) is positive and significant in all three periods, and $SHRCHQ_{oq}$ is negative and significant in all periods. Both growth variables, $GrLTNOA_{oq}$ and

$GrCSALE_{oq}$, are insignificant in all periods, while NOA_{oq} is only significant over the reversal horizon. The significance of the variables that control for risk increases with the length of the return period. Overall, the results reported in Table 5, Panels A and B, show a gradual price correction of originated accruals, with the majority of the correction occurring before the earnings for the reversal quarter are announced. This evidence of a gradual price correction for accrual originations is consistent with investor learning: after mispricing the originated accruals, investors gradually learn and correct the mispricing by the time of accrual reversal.

While Panels A and B of Table 5 show that the repricing of the originating accruals is gradual and continues up to the reversal point, to claim that the repricing ends by the time accruals reverse (Hypothesis H2c), we have to demonstrate that there is no repricing of the originating accruals beyond the accrual reversal point. Panel C of Table 5 shows that 1-, 2-, and 4-quarter mean size-adjusted returns after the positive accrual reversal quarter are 0.51 percent, 0.80 percent, and 0.83 percent, respectively. The 1- and 2-quarter mean returns are weakly significant (at the 10 percent level), while the 4-quarter mean return is insignificant. For firms with reversed negative extreme accruals, the 1-, 2-, and 4-quarter mean returns after the accrual reversal quarter are -0.04 percent, -0.64 percent, and 0.49 percent, respectively, none of which are significant. These abnormal returns are all economically very small, in contrast to the large abnormal returns for the accrual originations over the reversal horizon. Figure 2 depicts the 12-month abnormal returns following accrual originations and accrual reversals, separately for positive and negative accrual originations and reversals (Panels A and B, respectively). As seen from Figure 2, there is a noticeable difference in the monthly returns following the two events. While there is a large future abnormal return for firms with originating accruals (both positive and negative), future abnormal returns for firms with reversing accruals remain close to zero.

[INSERT FIGURE 2 ABOUT HERE]

Finally, we examine the association of the originating accruals CAC_{oq} with abnormal stock returns subsequent to the reversal quarter, *rq*. We use the same model as in equation (4), except that we now use originating accruals (CAC_{oq}) instead of reversing accruals (CAC_{rq}). The results reported in Table 5, Panel D show that the coefficient on CAC_{oq} is insignificant in all three post-reversal periods, suggesting that the originating accruals are not repriced after the accrual reversals. Given that the originated accruals are repriced over the reversal horizon (Table 5, Panels A and B), but not beyond the reversal quarter (Table 5, Panels C and D), we conclude that the accrual anomaly ends by the time the originated accruals reverse, which is consistent with Hypothesis H2c. DeFond and Park (2001) show that to a very small degree, investors anticipate the reversing implications of (abnormal) accruals and adjust stock prices at earnings announcements, but the majority of the price adjustment takes place gradually later. Our analysis complements DeFond and Park (2001) by showing *when* the market repricing of originated accruals is complete. Our analysis also complements Thomas and Zhang (2002), who examine the degree of mispricing of each accrual account. We show that it is not just the specific accrual that is mispriced (e.g., inventory), but also the originating or reversing nature of the accrual, i.e., the origination being mispriced and the reversal being priced correctly.

6. Accrual originations, accrual reversals, and revisions in analysts' earnings forecasts

Research on investor learning (e.g., Balsam et al. 2002, Feng and Seasholes 2005, Dhar and Zhu 2006, Seru, Shumway, and Stoffman 2010, Korniotis and Kumar 2011) suggests that sophisticated investors learn to use information more efficiently than unsophisticated investors. In this section, we examine whether financial analysts who are considered sophisticated users of financial information are capable of understanding the different effects of accrual originations and accrual reversals on future earnings. As discussed in section 2, if an originating accrual contains an estimation error, future earnings will be affected by the reversal of this error.[30] In contrast, future earnings after the reversing accrual will not be affected because the initial accrual estimation error has already been corrected at the reversal. Because accrual originations have implications for future earnings, while accrual reversals do not, we should observe differential analyst forecast revisions (AFR) following these two types of accruals, if analysts distinguish between accrual originations and accrual reversals.

To test Hypothesis H3, we examine AFR for quarter *q+1*, the quarter following either the origination quarter or the reversal quarter. First, we divide analysts' earnings forecasts for *q+1* into those issued before and after earnings for quarter *q* are reported. We denote the former as early forecasts (*Pre*), and the latter as late forecasts (*Post*). Next, we define AFR as the difference between the pre and post forecasts for *q+1*: *AFR=Pre-Post*. Because an analyst can issue more than one forecast in each period, within a period we keep the analyst's latest forecast. If the analyst had a pre-forecast, but provides no new forecast in the later period, we consider it a zero *AFR*. If the analyst had no pre-forecast, but only a post-forecast, we drop this forecast because there is no baseline to determine the revision. Finally, we compare (a) *AFR* after the origination of positive accruals to *AFR* after the reversal of negative accruals, as both of these are large positive accruals; and (b) *AFR* after the origination of negative accruals to *AFR* after the reversal of positive accruals, as both of these are large negative accruals.

[30] We examine seasonal earnings changes in the reversal quarter for positive and negative accrual reversals, each relative to a control sample matched on industry membership, year and quarter, and the prior quarter's MVE, BM, and ROA. These results show a significant negative -0.014 (positive 0.009) reversal quarter earnings change for the reversals of positive (negative) accruals. These results are consistent with originating accruals containing a significant transitory earnings component (accrual estimation error).

We employ two measures for *AFR*. The first measure, *REVIS*, is the revision of analysts' earnings per share forecasts, which is intuitive for assessing the economic significance of the univariate results. The second measure, *REVIS_PRC*, is *REVIS* scaled by the share price and multiplied by 100 (e.g., Denis, Denis, and Sarin 1994, Kasznik and Lev 1995). Given the results in prior studies that analysts start with overly optimistic earnings forecasts and then gradually walk down the numbers (e.g., Das, Levine, Sivaramakrishnan 1998, Richardson, Teoh, and Wysocki 2004, Ke and Yu 2006), we expect *AFR* to be on average negative, and therefore, our focus is on a relative measure: the difference in revisions between following originations and following reversals.

Panel A of Table 6 reports the univariate results and shows substantial differences in analysts' behavior. Analysts revise their earnings forecasts down much more (less) after positive (negative) accrual originations than after accrual reversals, and the results are very similar for both revision measures. For example, after observing large positive accruals that are originations, analysts lower their forecast on average by 3.4 cents per share, while they lower it by only 1.5 cents per share after observing large positive accruals that are reversals of past negative accrual originations. These results are consistent with originated positive accruals having a significantly more negative effect on future earnings than reversing negative accruals. After observing large negative accrual originations, analysts lower their forecast on average by only 1.8 cents per share, while they lower it by 3.0 cents per share after observing large negative accruals that are reversals of past positive accruals. These results are consistent with originating negative accruals having significantly more positive effects on future earnings than reversing positive accruals. Overall, these results suggest that analysts understand the difference between originating and reversing accruals, and reflect it in their forecast revisions.

[INSERT TABLE 6 ABOUT HERE]

Next, we complement the univariate analysis above with multivariate tests, using the following model:

$$REVIS / REVIS\_PRC_{q+1} = \alpha_0 + \alpha_1 CAC_q + \alpha_2 CAC_q * D\_orig + \alpha_3 CFOCHG_q + \alpha_4 CFOCHG_q * D\_orig + \alpha_5 SALECHG_q + \alpha_6 \log MVE_q + \alpha_7 D\_SEO_q + \varepsilon_{q+1} \quad (7)$$

In (7), we regress each of the *AFR* measures for the next quarter's earnings after the accrual origination or the accrual reversal, *q+1*, on the accruals in quarter *q*, CAC_q, and on the other controls. We also include the interaction of CAC_q with the indicator variable *D_orig,* which takes the value of 1 for accrual originations and 0 otherwise to capture the differential impact of originations on analysts' revisions. We include in the model the seasonal change in cash flows from operations, $CFOCHG_q$, to capture the revision in the forecast due to the change in the economic performance of the firm, and also interact $CFOCHG_q$ with *D_orig* to allow for the differential AFR between originations and reversals with respect to economic performance. We add to the model the seasonal change in sales, $SALECHG_q$, as those can also affect analysts' expectations regarding future earnings, and $logMVE_q$ to control for size effects. Lastly, Brous (1992) finds that analysts revise earnings forecasts downward when firms announce plans to issue additional common shares. Therefore, we add to the model the indicator variable D_SEO_q, which is set to 1 if the stock-split adjusted number of outstanding shares increases by at least 10 percent in the following 12 months, and to 0 otherwise. Because more than one analyst may follow a firm, and analysts might herd in their forecast revisions (Graham 1999, Hong, Kubik, and Solomon 2000, Welch 2000, Clement and Tse 2005), we cluster by quarter and firm for the estimation of (7).

We report the multivariate results in Panel B of Table 6. Consistent with the walk-down by analysts, the intercept in all regressions is negative and significant. The coefficient on CAC_q is positive and significant, suggesting that, in general, accruals are positively associated with *AFR*. Our variable of interest, CAC_q**D_orig,* has a negative and significant (weakly significant) coefficient in three (one) model specifications. These results are consistent with the univariate results above and imply that analysts are able to differentiate accrual originations from accrual reversals, as their earnings revisions are significantly more negative (positive) when positive (negative) extreme accruals are originations than when they are reversals. $CFOCHG_q$ is positive and significant, suggesting that analysts are sensitive to changes in the economic performance of a firm. We do not observe the differential AFR between originations and reversals with respect to economic performance, as $CFOCHG_q$**D_orig* is insignificant. The differential revision of accrual originations and reversals, but not of the cash flows in such situations further suggests that the significant negative coefficient on CAC_q**D_orig* is due to the different effects of accrual originations and reversals on future earnings. *SALECHG* is also positively associated with *AFR*, suggesting that sales growth is an indicator for an expected increase in future earnings. $logMVE_q$ is positively associated with the revision, while D_SEO_q is insignificant.

Overall, the results reported in Table 6 suggest that financial analysts distinguish between originating and reversing accruals and revise their forecasts according to the different implications of these accruals on future earnings. Given that analysts' earnings forecasts are informative to investors (e.g., Griffin 1976, Givoly and Lakonishok 1979, 1980, Elton, Gruber, and Gultekin 1981; Imhoff and Lobo 1984), and that investors react to forecast revisions (e.g., Gleason and Lee 2003, Hui and Yeung 2013), our results imply that information from financial analysts facilitates the learning process of investors and contributes to the price correction process.

Bradshaw et al. (2001) conclude that analysts do not fully understand the implications of high accruals on future earnings, as they find a negative association between analysts' forecast errors and the level of accruals. It is important to understand that their findings do not necessarily conflict with ours. Our results do not speak to whether analysts fully understand accruals. We rather demonstrate that analysts appear to recognize accrual originations and reversals and incorporate their differential effects on future earnings, even though their forecasts contain errors. DeFond and Park (2001) examine how the presence of positive versus negative abnormal accruals in earnings affects analysts' earnings forecast revisions and find that analysts take into consideration the reversing implications of abnormal accruals in revising future earnings forecasts. We extend their findings by showing that analysts possess even greater ability. We demonstrate that when analysts observe reported earnings that include positive or negative large accruals, they consider whether these accruals are originations or reversals and differentially incorporate the implications on their earnings forecasts. Thus, we believe that our analysis highlights a unique aspect of analysts' abilities with respect to accruals that has not been examined yet.

7. Ex-ante use of accrual reversals to improve the accrual-based trading strategy

Our analysis of the two stages of accruals, origination and reversal, demonstrates that accrual mispricing is not present for a broad class of extreme accruals that are accrual reversals. Therefore, any accrual anomaly-related study could benefit if the accrual reversals were detected ex-ante and separated from the extreme accrual sample. In this section, we test Hypothesis H4 and demonstrate how our method can be used ex-ante to improve returns on the accrual-based trading strategy. Specifically, in each quarter q of our sample period, we first sort all firms with a minimum stock price of $2 by current accruals and retain those in the top two and bottom two deciles. Next, for each of the extreme positive current accruals in quarter *q*, we look back up to 20 quarters (from quarter *q-1* to quarter *q-20*) to see if the firm had a quarter in which: (a) negative current accruals were at least 50 percent of the positive current accruals in quarter *q*; and (b) NWC was in the bottom three deciles. If both (a) and (b) are satisfied in a past quarter, then the accrual in that quarter can be classified as an origination, while the accrual in quarter q can be classified as a reversal. We do exactly the opposite for each extreme negative current accrual in quarter *q*. This procedure effectively splits the sample of extreme accruals in quarter *q* into two subsamples: (1) firms with accrual reversals in *q*; and (2) all other extreme accrual firms. Thus, when we form the extreme accrual portfolio in each quarter to trade on the accrual anomaly, we detect accrual reversals and remove them from the portfolio.

Table 7, Panel A reports 12-month abnormal returns for three portfolios: (a) all firms with extreme current accruals; (b) firms with extreme current accruals that are accrual reversals; and (c) all firms from (a), except for firms with accrual reversals. Within each portfolio, abnormal returns are reported separately for positive and negative accrual firms, as well as the trading strategy (hedge) returns from going long in firms with negative accruals and short-selling firms with positive accruals in *q*.[31] The results show that, as expected, the portfolio of firms with accrual reversals (middle column) earns no significant 12-month abnormal returns (0.99 percent and 0.30 percent for extreme positive and negative accruals, respectively). Thus, excluding those firms from the extreme accrual portfolio improves the overall return from the accrual-based trading strategy. Specifically, the 12-month hedge return for all extreme accrual firms (left

[31] Panel A of Table 7 (middle column) shows that the number of detected extreme negative accrual reversals is larger than the number of detected extreme positive accrual reversals (13,042 versus 7,172). Since the exclusion of firms with reversals is done ex-ante, an investor can adjust the weights on the stocks in each portfolio to maintain a zero investment strategy.

column) is a significant 5.65 percent (-3.32 percent and 2.33 percent for positive and negative accruals, respectively). However, after excluding firms with accrual reversals (right column), the 12-month hedge return increases to a significant 6.98 percent (-3.99 percent and 2.99 percent for extreme positive and negative accruals, respectively). This is an economically significant 23.5 percent hedge relative return improvement, and is statistically significant at the 10 percent level (t-value of 1.95).[32]

[INSERT TABLE 7 ABOUT HERE]

While the hedge return improvement in Panel A is appealing, it is possible that our procedure removes from the portfolio less risky securities, and thus, the improvement simply reflects the higher risk premium for the remaining firms in the portfolio. To rule out this possibility, we employ a regression model similar to the one we use in our prior return tests, which controls for risk factors and other anomalies. We run the following regression using all extreme accrual observations:

$$\begin{aligned} ABRET_{q+1\ to\ q+4} &= \alpha_0 + \alpha_1 CAC_q + \alpha_2 CAC_q * D\_rev + \alpha_3 NOA_q + \alpha_4 GrLTNOA_q + \alpha_5 GrCSALE_q \\ &+ \alpha_6 SHRCHG_q + \alpha_7 Beta_q + \alpha_8 \log MVE_q + \alpha_9 \log BM_q + \alpha_{10} MOM_q + \varepsilon_{q+1\ to\ q+4} \end{aligned} \quad (8)$$

In (8), $ABRET_{q+1\ to\ q+4}$ is the 12-month size-adjusted return after portfolio formation in quarter q. D_rev is an indicator variable that is set to 1 when the extreme accruals reverse in quarter q and to 0 otherwise. All other variables are defined as before and are measured as of quarter q. The coefficient of CAC_q, α_1, should be negative, according to the accrual anomaly, since only extreme accrual observations are used in the estimation of (8). Coefficient α_2 reflects the incremental pricing of the reversing accruals. Given the above result that the accrual anomaly

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[32] Note that the improvement in returns is achieved with the exclusion of only 19 percent of the observations ((7,172+13,042)/(53,092+53,068)). A more aggressive refinement to the portfolio is likely to achieve a higher return improvement. However, we will leave it to investors to optimize the return strategy. Our goal is simply to demonstrate that our method can help them in improving returns.

ends by the time accruals reverse, there should be no association between the reversing accruals in *q* and future abnormal returns. Thus, α_2 should be positive and the sum $\alpha_1+\alpha_2$ should be statistically indistinguishable from zero. Table 7, Panel B shows that, consistent with our predictions, α_1 is significantly negative (-0.343), α_2 is significantly positive (0.431), and the sum of α_1 and α_2 is insignificantly different from zero ($\alpha_1+\alpha_2$ =0 is rejected at conventional levels, as shown in the bottom of the panel). All control variables in the model are strongly significant. In summary, the results are consistent with Hypothesis H4. Using our method, we are able to improve the performance of the accrual-based trading strategy by ex-ante removing firms with reversing accruals from the extreme accrual portfolio.[33]

8. Conclusions

When Sloan (1996) discovered the accrual anomaly, he proposed earnings fixation as its cause. The fixation hypothesis states that this anomaly is due to mispricing caused by investors' fixation on reported earnings, and their inability to incorporate the lower persistence of accruals (as compared to that of cash flows) into their expectations of future earnings.

To better understand whether earnings fixation explains the accrual anomaly, and to examine how accrual mispricing is corrected by market participants, this paper examines two types of accruals: accrual originations and accrual reversals. We start by developing a three-step procedure for ex-ante detecting accrual originations and their reversals. We then document that both accrual origination and accrual reversal firms have low accruals and earnings persistence. If

[33] Recent studies, e.g., Green, Hand, and Soliman (2011), present evidence that the accrual anomaly has significantly diminished after 2002. To make sure that this has no effect on our results, we repeated our tests for a subsample of originations up to the end of year 2001 to ensure that almost no reversals occur after 2002. Our inferences remain the same (untabulated).

indeed investors naively fixated on earnings, this would cause a mispricing of both types of accruals. However, we find that only originating accruals are mispriced, while reversing accruals are not. These results are consistent with an initial fixation on the originated accruals, followed by gradual learning and price correction that ends by the time accruals reverse.

We find further support for investor learning by analyzing analysts' earnings forecast revisions. Specifically, we document that analysts revise their earnings forecasts for accrual origination and accrual reversal firms in a way consistent with the different effects that accrual originations and accrual reversals have on future earnings. Given that analysts' earnings forecasts are known to be informative to investors, we conclude that analyst forecast revisions constitute one mechanism through which investors learn. Finally, we demonstrate the usefulness of our procedure to improve returns from trading on the accrual anomaly. We show that by removing reversing accrual firms from the trading portfolio of extreme accruals, the trading strategy (hedge) return increases by 1.33 percent, from 5.65 percent to 6.98 percent (a relative 23.5 percent improvement). Overall, the study points to the importance of distinguishing between originating and reversing accruals in testing the fixation hypothesis for the accrual anomaly and offers a method for ex-ante detecting these two types of accruals.

Appendix: A Summary of Methods to Identify Accrual Originations and Reversals

We searched the literature to see whether any prior studies have developed methods to explicitly detect accrual originations and reversals *ex-ante*, which is what we need for the objectives of this study. Overall, the conclusion from our search is that none of the methods available can reliably detect ex-ante both accrual originations and accrual reversals at the firm level. We discuss the methods available below.

Allen et al. (2013) present a method for detecting accrual originations and reversals. Each year accruals are sorted into quintiles and then a transition from a high accrual quintile in year t to a low accrual quintile in year $t+1$ is classified as an origination of a positive accrual in year t, and its reversal in year $t+1$. Similarly, a transition from a low accrual quintile in one year to a high accrual quintile in the following year is classified as the origination and the reversal, respectively, of a negative accrual.[34] First, it is obvious that this method allows to detect accrual originations only ex-post, i.e. after the reversal has also been detected. Second, it comes with a serious downside: the high potential for misclassification of originations and reversals. This is because only two adjacent periods are taken into consideration. To see this, consider the following simple example. In year 1999 the firm reports a large negative accrual and in year 2000 a large positive accrual. The method will classify the 1999 accrual as an origination (of a negative accrual) and the 2000 accrual as a reversal (of the 1999 accrual). Moving now to the next sorting period, assume that the same firm with the large positive accrual in 2000 reports a large negative accrual in year 2001. Then the method will classify the 2000 accrual as an origination (of a positive accrual) and the 2001 accrual as a reversal (of the 2000 accrual). Therefore, the year 2000 accrual will be classified as an accrual reversal in the first sorting

[34] Zach (2006) uses a similar approach with a sort into deciles.

period and as an accrual origination in the following sorting period. This is a clear misclassification, because a specific accrual must be either an origination or a reversal. In contrast, by conditioning on both accruals and NWC being in the same direction (either high for origination of positive accruals, or low for origination of negative accruals) in a given period, our method detects accrual originations ex-ante within one period, and circumvents both the ex post detection and the misclassification problems of the Allen et al. (2013) method.

DeFond and Park (2001) present a method that calculates abnormal accruals as the difference between realized working capital and an expectation of the level of working capital based on past realizations. They interpret the difference as "working capital accruals that are unlikely to be sustained in the future and, therefore, are likely to reverse against future earnings" (p. 377). Based on this statement, we in turn interpret their calculated numbers as ex-ante originations of positive (negative) abnormal accruals when the difference is positive (negative). While their method can be applied ex-ante, it focuses on abnormal accruals and we do not see a way to apply it to current total accruals which is a variable of interest in our study. In addition, it is not clear how the method can be used to detect ex-ante accrual reversals which we also need in our study.

Baber et al. (2011) are interested in the speed of reversal of quarterly abnormal accruals in the context of earnings management. They estimate the speed of reversal with the autocorrelation coefficients of quarterly abnormal accruals. Their method does not propose a procedure for detecting accrual originations and mainly concentrates on accrual reversals. Since in this study we are not interested in the speed of reversal, and are not focused on earnings management, but our main objective is to detect accruals originations and reversals, we cannot use their constructs.

To sum, while a few prior studies propose methods for detecting accrual originations and reversals, none of them proposes a fundamentally sound way for detecting these two important accrual stages ex-ante. By taking into consideration the balance sheet effect of accruals, our method represents a more reliable way for detecting ex-ante accrual originations and reversals at the firm level.

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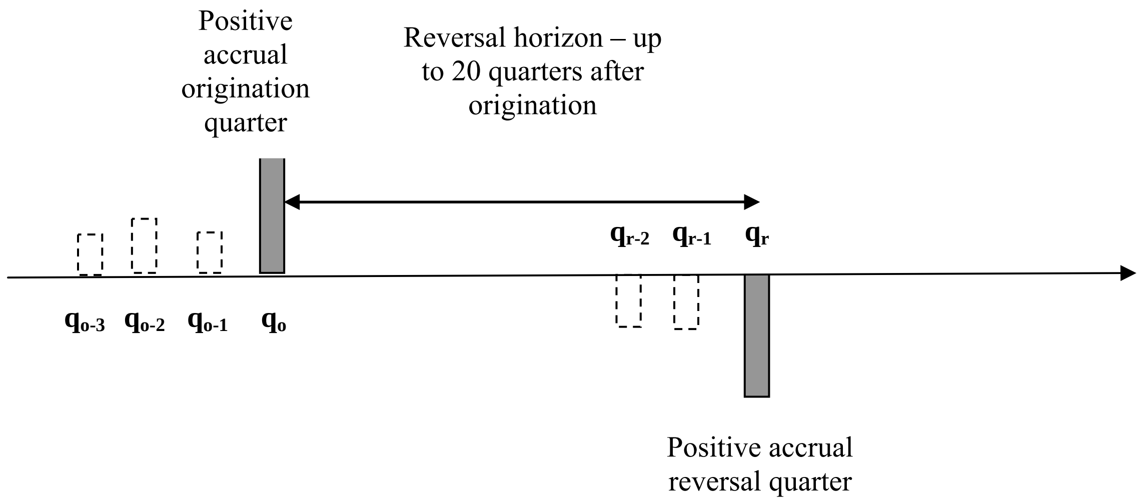
Figure 1 Defining positive accrual origination quarter, positive accrual reversal quarter, and reversal horizon

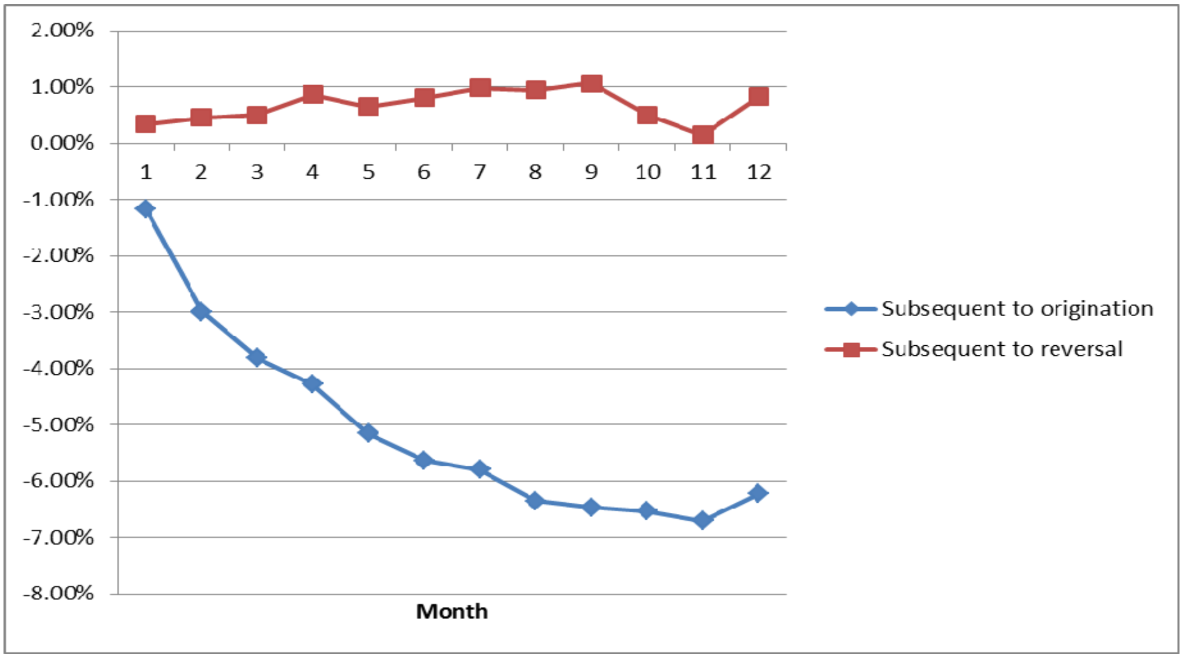


q_o – positive accrual origination quarter: Current accruals are in the top two deciles and net working capital is in the top three deciles.

q_r – positive accrual reversal quarter: Current accruals (in up to three consecutive quarters) are negative and at least 50 percent the absolute value of the positive current accruals at the origination quarter.

Figure 2 12-month stock returns subsequent to accrual originations and reversals

Panel A: Monthly abnormal stock returns (*ABRET*) up to 12 months subsequent to *positive* accrual originations and *positive* accrual reversals.



Panel B: Monthly abnormal stock returns (*ABRET*) up to 12 months subsequent to *negative* accrual originations and *negative* accrual reversals.

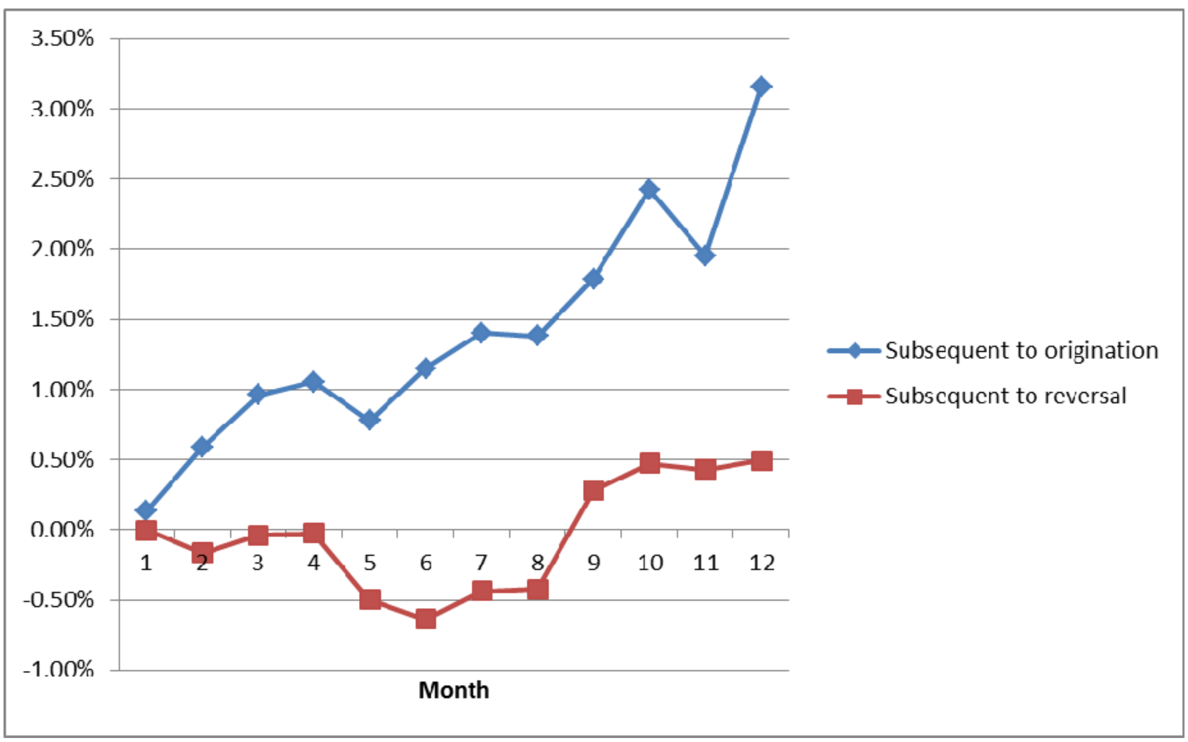


Table 1 Validation of the accrual originations and reversals detection method

Panel A: Frequencies and magnitudes of extreme positive current accruals classified as accrual originations with reversals, and extreme positive current accruals that are not classified as accrual originations by our method.

	Extreme positive accruals classified as originations				Extreme positive accruals not classified as originations			
	Frequency	Mean	Median	N	Frequency	Mean	Median	N
AR(+)	0.551	0.0460	0.0251	8,757	0.369	0.0218	0.0081	27,581
INV(+)	0.462	0.0177	0.0060	8,756	0.227	0.0073	0	27,612
AP(+)	0.284	-0.0002	0	8,726	0.352	0.0089	0	27,488
ALOTH(+)	0.308	0.0083	0.0028	8,766	0.461	0.0231	0.0098	27,718
AR(+) or INV(+)	0.787			8,757	0.509			27,581

Panel B: Frequencies and magnitudes of extreme negative current accruals classified as accrual originations with reversals, and extreme negative current accruals that are not classified as accrual originations by our method.

	Extreme negative accruals classified as originations				Extreme negative accruals not classified as originations			
	Frequency	Mean	Median	N	Frequency	Mean	Median	N
AR(-)	0.335	-0.0084	0	7,417	0.485	-0.0233	-0.0080	32,370
INV(-)	0.172	-0.0010	0	7,418	0.421	-0.0116	0	32,392
AP(-)	0.378	-0.0165	-0.0037	7,406	0.288	-0.0083	0	32,320
ALOTH(-)	0.466	-0.0184	-0.0079	7,419	0.393	-0.0158	-0.0043	32,525
AP(-) or ALOTH(-)	0.742			7,419	0.604			32,525

Panel C: Frequencies and magnitudes of extreme positive current accruals classified as accrual reversals by our three-step method for the "accrual originations with reversals" sample.

	Extreme positive accrual reversals			
	Frequency	Mean	Median	N
AR(-)	0.556	-0.0328	-0.0169	8,839
INV(-)	0.535	-0.0197	-0.0071	8,841
AP(-)	0.270	-0.0061	0	8,836
ALOTH(-)	0.328	-0.0136	-0.0033	8,842
AR(-) or INV(-)	0.800			8,839

Panel D: Frequencies and magnitudes of extreme negative current accruals classified as accrual reversals by our three-step method for the "accrual originations with reversals" sample.

	Extreme negative accrual reversals			
	Frequency	Mean	Median	N
AR(+)	0.282	0.0163	0.0034	7,485
INV(+)	0.134	0.0036	0	7,487
AP(+)	0.359	0.0088	0	7,475
ALOTH(+)	0.426	0.0185	0.0080	7,486
AR(+) or INV(+)	0.682			7,486

Variable definitions are as follows: *AR* is the increase in accounts receivable (RECCHY); *INV* is the increase in inventory (INVCHY); *AP* is the decrease in accounts payable and accrued liabilities (APALCHY); and *ALOTH* is the decrease in other assets and liabilities (AOLOCHY). All variables are measured from the statement of cash flows, scaled by lagged total assets (ATQ), and reported after each is winsorized at the top and bottom 0.5 percent. We recode missing values of RECCHY, INVCHY, and APALCHY as zero if there is a non-missing value of AOLOCHY. Conversely, if AOLOCHY is missing, but the other items are not missing, then we recode AOLOCHY as zero. The (+) and (-) signs in panels A and B indicate that the variables should have mean and median positive or negative values because they belong to the top or bottom two accrual deciles, respectively. The (-) and (+) signs in panels C and D indicate that the variables should have mean and median negative or positive values because they relate to the reversals of positive and negative accrual originations, respectively.

Table 2 Summary statistics for positive and negative accruals with reversal samples

Panel A: Cumulative distribution of accrual reversals by the reversal horizon for positive and negative accruals with reversal samples.

	Positive accruals with reversal sample		**Negative accruals with reversal sample**	
Reversal horizon	% of firm-quarters	Cumulative % of firm-quarters	% of firm-quarters	Cumulative % of firm-quarters
Within 1 year	89.8%	89.8%	91.1%	91.1%
Within 2 years	7.6%	97.4%	6.5%	97.6%
Within 3 years	1.8%	99.2%	1.6%	99.2%
Within 5 years	0.8%	100.0%	0.8%	100.0%
Mean Reversal horizon (in quarters)	2.32		2.19	
Median Reversal horizon (in quarters)	2.00		1.00	

Panel B: Distribution of accrual origination and accrual reversal quarters by fiscal quarter for positive and negative accruals with reversal samples.

	Fiscal quarters				**P-value of equality**
	Q1	**Q2**	**Q3**	**Q4**	
Positive accrual origination quarters	25.3%	24.7%	31.3%	18.7%	<0.001
Positive accrual reversal quarters	14.4%	18.3%	21.9%	45.4%	<0.001
Negative accrual origination quarters	30.1%	26.1%	23.4%	20.4%	<0.001
Negative accrual reversal quarters	24.7%	28.7%	23.7%	22.9%	<0.001

Panel C: Mean values of key variables for positive and negative accruals with reversal samples at origination and at reversal.

	Positive accruals with reversal sample		**Negative accruals with reversal sample**		**Difference: Originations Vs. Reversals**	
	Positive Accrual Originations	Positive Accrual Reversals	Negative Accrual Originations	Negative Accrual Reversals	Positive Accruals	Negative Accruals
CAC	0.074	-0.080	-0.054	0.062	0.154***	-0.116***
CAC_btw	-0.0022	-0.0022	0.0022	0.0022	0	0
NWC	0.400	0.286	-0.087	-0.031	0.114***	0.056***
BM	0.67	0.73	0.38	0.38	-0.06***	0.00
Beta	1.07	1.08	1.26	1.26	-0.01	0.00
TA	468.11	471.03	1,183.92	1,225.61	-2.92	-41.69
LEV	20.86%	18.55%	19.36%	20.31%	2.31%***	-0.95%***
GrLTNOA	2.10%	2.89%	4.31%	1.47%	-0.79%***	2.84%***
SALES	186.15	205.57	280.87	285.44	-19.42**	4.57
GrCSALE	-0.013	0.067	0.036	-0.015	-0.080***	0.051***
ROA	1.24%	-0.62%	-2.94%	-1.47%	1.86%***	-1.47%***
CFO	-0.044	0.087	0.042	-0.042	-0.131***	0.084***
N	8,974	8,974	7,670	7,670		

Variable definitions are as follows: *CAC_btw* are current accruals for the period between the accrual origination quarter and the reversal quarter, where *CAC* is current accruals, measured as the difference between income before extraordinary items and cash flows from continuous operations (IBQ-(OANCFY-XIDOCY)), adjusted for non-current accruals such as depreciation, sale of long-term assets, goodwill impairment, etc., scaled by total assets at the beginning of the quarter (ATQ); *NWC* is net working capital at the end of the quarter (ACTQ-CHEQ-LCTQ+DLCQ), scaled by total assets at the beginning of the quarter (ATQ); *BM* is the ratio of the book value of equity to the market value of equity at the end of the quarter (SEQQ/(PRCCQ*CSHOQ)); *Beta* is the firm-specific coefficient from regressing monthly raw returns on the equal-weight market returns index for the prior 36 months (we require a minimum of 15 monthly observations for the estimation); *SALES* are annual sales in millions of dollars (SALE); *GrCSALE* is the percentage change in annual cash sales (SALE+RECCH); *TA* are total assets in millions of dollars (ATQ); *LEV* is leverage, measured as the ratio of long-term debt plus debt in current liabilities to total assets ((DLTTQ+DLCQ)/ATQ); *ROA* is the return on assets, measured as earnings before extraordinary items for the accrual origination quarter, scaled by total assets in the beginning of the quarter (IB/ATQ); *CFO* is cash flows from continuing operations in millions of dollars (OANCFY-XIDOCY); and *GrLTNOA* is growth in long-term net operating assets, measured as the change in net operating assets minus the change in current accruals (ΔNOA-ΔCAC), scaled by the beginning of the quarter total assets. *NOA* is measured as accounts receivable, plus inventory, plus other current assets, plus net property, plant, and equipment, plus intangible assets, plus other long-term assets, minus accounts payable, minus other current liabilities, minus other long-term liabilities (RECTQ+INVTQ+ACOQ+PPENTQ+INTANQ+ALTOQ-APQ-LCOQ-LOQ). All variables except for *CAC_btw* and *CAC* are measured as of the accrual origination quarter. *CAC* is measured for both, origination and reversal quarters.

The samples cover the period 1989 to 2008. The positive accruals with reversals sample consists of 8,974 firm-quarter observations, and the negative accruals with reversals sample consists of 7,670 firm-quarter observations.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for two-tailed t-tests of differences in means.

Table 3 Accrual and earnings persistence tests

Panel A: Current accrual persistence test. A regression of future current accruals (defined as the sum of accruals of the following four quarters) on current accruals, CAC_q, the interaction of CAC_q with *D_orig*, an indicator variable for accrual originations, and the interaction of CAC_q with *D_rev*, an indicator variable for accrual reversals.

$$CAC_{q+1\,to\,q+4} = \alpha_0 + \alpha_1 CAC_q + \alpha_2 CAC_q * D\_orig + \alpha_3 CAC_q * D\_rev + \varepsilon_{q+1\,to\,q+4} \quad (1)$$

Variable	**Coefficient**
Intercept	0.011***
	(16.47)
CAC_q	0.387***
	(32.83)
CAC_q*D_orig	-0.492***
	(-27.19)
CAC_q*D_rev	-0.525***
	(-27.06)
N	262,609
Adj-R^2	2.2%

Panel B: Earnings persistence tests. A regression of future earnings (defined as the sum of earnings of the following four quarters) on current earnings, EAR_q, the interaction of EAR_q with *D_orig,* an indicator variable for accrual originations, the interaction of EAR_q, with *D_orig_rev,* an indicator variable for accrual originations for which we find reversals, and the interaction of EAR_q with *D_rev,* an indicator variable for accrual reversals. EAR_q are quarterly earnings before extraordinary items, scaled by lagged total assets.

$$EAR_{q+1\,to\,q+4} = \alpha_0 + \alpha_1 EAR_q + \alpha_2 EAR_q * D\_orig + \alpha_3 EAR_q * D\_orig\_rev + \alpha_4 EAR_q * D\_rev + \varepsilon_{q+1\,to\,q+4} \quad (2)$$

Variable	**Coefficient**
Intercept	-0.015***
	(-12.84)
EAR_q	3.422***
	(95.39)
EAR_q*D_orig	-0.277***
	(-4.40)
EAR_q*D_orig_rev	-0.313***
	(-3.98)
EAR_q*D_rev	-0.581***
	(-8.52)
N	294,852
Adj-R^2	60.2%

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for a two-tailed t-test.

Table 4 Accrual originations, accrual reversals, and future 1-, 2-, and 4-quarter stock returns

Panel A: Accrual originations and future stock returns: regression of 1-, 2-, and 4-quarter size-adjusted stock returns on extreme current accruals, *CAC*, growth in long-term net operating assets, *GrLTNOA*, net operating assets, *NOA*, percentage seasonal change in cash sales, *GrCSALE*, net stock issues, *SHRCHG*, stock beta, *Beta*, firm size, *logMVE*, book-to-market ratio, log*BM*, and return momentum, *MOM,* for the positive and negative accrual originations samples pooled together:

$$ABRET_{oq+1\ to\ oq+j} = \alpha_0 + \alpha_1 CAC_{oq} + \alpha_2 GrLTNOA_{oq} + \alpha_3 NOA_{oq} + \alpha_4 GrCSALE_{oq} + \alpha_5 SHRCHG_{oq} + \alpha_6 Beta_{oq} + \alpha_7 \log MVE_{oq} + \alpha_8 \log BM_{oq} + \alpha_9 MOM_{oq} + \varepsilon_{oq+1\ to\ oq+j} \quad (3)$$

	1 quarter	**2 quarters**	**4 quarters**
Intercept	-0.033***	-0.057***	-0.062***
	(-3.47)	(-4.02)	(-2.72)
CAC_{oq}	-0.090***	-0.166***	-0.330***
	(-2.74)	(-3.47)	(-4.30)
$GrLTNOA_{oq}$	0.020	0.059*	-0.005
	(0.86)	(1.70)	(-0.93)
NOA_{rq}	-0.045***	-0.063***	-0.063***
	(-4.83)	(-4.44)	(-3.01)
$GrCSALE_{oq}$	0.001	0.003	-0.016***
	(0.17)	(0.07)	(-3.05)
$SHRCHG_{oq}$	-0.054***	-0.142***	-0.225***
	(-2.974)	(-5.61)	(-5.79)
$Beta_{oq}$	-0.011***	-0.018***	-0.028***
	(-4.63)	(-5.22)	(-6.26)
$logMVE_{oq}$	6.158***	10.756***	14.332***
	(5.70)	(6.57)	(5.60)
$logBM_{oq}$	0.052***	0.088***	0.110***
	(5.89)	(6,61)	(5.35)
MOM_{oq}	0.034***	0.063***	0.050***
	(6.31)	(7.12)	(4.63)
N	22,340	22,340	22,340
Adj-R^2	1.1%	1.4%	1.2%

Panel B: Accrual reversals and future stock returns: association between post-reversal stock returns and reversing accruals. Regression of 1-, 2-, and 4-quarter post-reversal size-adjusted stock returns on reversal quarter current accruals, CAC_{rq}, growth in long-term net operating assets, *GrLTNOA*, net operating assets, *NOA*, percentage seasonal quarterly cash sales change, *GrCSALE*, net stock issues, *SHRCHG*, stock beta, *Beta*, firm size, *logMVE*, book-to-market ratio, *logBM*, and return momentum, *MOM*, for the positive and negative accrual reversals samples pooled together:

$$ABRET_{rq+1\ to\ rq+j} = \alpha_0 + \alpha_1 CAC_{rq} + \alpha_2 GrLTNOA_{rq} + \alpha_3 NOA_{rq} + \alpha_4 GrCSALE_{rq} + \alpha_5 SHRCHG_{rq} + \alpha_6 Beta_{rq} + \alpha_7 \log MVE_{rq} + \alpha_8 \log BM_{rq} + \alpha_9 MOM_{rq} + \varepsilon_{rq+1\ to\ rq+j} \quad (4)$$

	1 quarter	**2 quarters**	**4 quarters**
Intercept	-0.034***	-0.043**	-0.049*
	(-3.02)	(-2.48)	(-1.79)
CAC_{rq}	-0.038	-0.056	0.034
	(-1.29)	(-1.19)	(0.48)
$GrLTNOA_{rq}$	0.022	-0.031	-0.046
	(0.66)	(-0.63)	(-0.63)
NOA_{rq}	0.003	-0.003	-0.032
	(0.03)	(-0.22)	(-1.28)
$GrCSALE_{rq}$	-0.001	0.001	-0.012
	(-0.30)	(0.06)	(-1.34)
$SHRCHG_{rq}$	-0.063***	-0.126***	-0.199***
	(-2.66)	(-3.57)	(-3.76)
$Beta_{rq}$	-0.003	-0.007	-0.017**
	(-1.07)	(-1.57)	(-2.51)
$logMVE_{rq}$	5.520***	5.803***	10.218***
	(4.19)	(2.94)	(3.35)
$logBM_{rq}$	0.024**	0.052***	0.080***
	(2.36)	(3.42)	(3.49)
MOM_{rq}	0.029***	0.062***	0.056***
	(3.98)	(5.70)	(3.44)
N	14,703	14,703	14,703
Adj-R^2	0.5%	0.8%	0.6%

Variable definitions are as follows (subscripts *oq* and *rq* refer to origination and reversing quarter values, respectively): $ABRET_{q+1\ to\ q+j}$ is the compounded buy-and-hold size-adjusted return for the period *q+1 to q+j*, where j=1, 2, and 4; *D_orig* is an indicator variable that takes the value of 1 for accrual origination and 0 otherwise; *NOA* is the firm's net operating assets, measured as accounts receivable, plus inventory, plus other current assets, plus property, plant, and equipment, plus intangible assets, plus other long-term assets, minus accounts payable, minus other current liabilities, minus other liabilities; *SHRCHG* is the change in the natural logarithm of split-adjusted shares outstanding in the previous 12 months, multiplied by the Compustat adjustment factor (CSHOQ*AJPQ); *logMVE* is the natural logarithm of the market value of equity at the end of the quarter, divided by 1,000; *logBM* is the natural logarithm of the ratio of the book value of equity to the market value of equity at the end of the quarter; *MOM* is the raw stock return in the past six months. For a detailed definition of the other variables, please refer to previous Tables.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for a two-tailed t-test.

Table 5 Repricing of originated accruals

Panel A: Mean size-adjusted stock returns for positive and negative accrual originations with reversal samples over three different periods: (1) the reversal horizon (from the accrual origination until the accrual reversal, including the reversal quarter); (2) the entire reversal quarter (starting two days after the previous quarter's earnings announcement and ending one day after the reversal quarter's earnings announcement); and 3) the three trading days surrounding the earnings announcement for the reversal quarter.

Period	**Positive accrual originations with reversals sample**	**Negative accrual originations with reversals sample**
Reversal horizon	-6.63%***	4.64%***
	(-14.51)	(8.25)
N	8,933	7,664
Reversal quarter	-1.80%***	2.92%***
	(-5.77)	(4.56)
N	8,876	7,546
3 days around earnings	0.24%**	0.25%**
announcement	(2.02)	(2.18)
N	8,876	7,546

Panel B: Two-stage regression of size-adjusted stock return over (1) the three trading days surrounding the earnings announcement for the reversal quarter; (2) the reversal quarter; and (3) the accrual reversal horizon, on the seasonal quarterly earnings change, ΔEAR,(which is orthogonal to the origination quarter's accruals, growth in long-term net operating assets and percentage seasonal change in cash sales), origination quarter current accruals, *CAC*, origination quarter growth in long-term net operating assets, *GrLTNOA*, origination quarter percentage seasonal change in cash sales, *GrCSALE*, origination quarter net stock issues, *SHRCHG*, beginning of the reversal quarter/reversal horizon stock beta, *Beta*, beginning of the reversal quarter/reversal horizon firm size, *logMVE*, beginning of the reversal quarter/reversal horizon book-to-market ratio, *BM*, beginning of the reversal quarter/reversal horizon momentum, *MOM*, and the reversal horizon, *RevHORZ*, for the positive and negative accrual origination with reversal samples pooled together:

First stage:

$$\Delta EAR_{rq/rh} = \alpha_0 + \alpha_1 CAC_{oq} + \alpha_2 GrLTNOA_{oq} + \alpha_3 GrCSALE_{oq} + \varepsilon_{rq/rh} \tag{5}$$

Second stage: return over the 3 days around earnings announcement period, over the reversal quarter and over the reversal horizon:

$$\begin{aligned} ABRET_{3d/rq/rh} &= \beta_0 + \beta_1(\Delta EAR_{rq/rh} - \Delta \hat{EAR}_{rq/rh}) + \beta_2 CAC_{oq} + \beta_3 NOA_{oq} + \beta_4 GrLTNOA_{oq} \\ &+ \beta_5 GrCSALE_{oq} + \beta_6 SHRCHG_{oq} + \beta_7 Beta_{rq/rh} + \beta_8 \log MVE_{rq/rh} + \beta_9 \log BM_{rq/rh} \\ &+ \beta_{10} MOM_{rq/rh} + \beta_{11} RevHORZ_{rh} + \mu_{3d/rq/rh} \end{aligned} \tag{6}$$

First-stage coefficients		
	Reversal quarter	**Reversal horizon**
Intercept	0.001	0.001
	(1.25)	(1.32)
CAC_{oq}	-0.136***	-0.235***
	(-13.52)	(-13.45)
$GrLTNOA_{oq}$	-0.025***	-0.041***
	(-3.20)	(-2.25)
$GrCSALE_{oq}$	0.002*	0.002
	(1.74)	(0.74)
N	13,851	13,606
Adj-R^2	2.6%	2.6%

Second-stage coefficients			
	3-day	**Reversal quarter**	**Reversal horizon**
Intercept	0.001	-0.024**	-0.003
	(0.27)	(-2.01)	(-0.19)
$(\Delta EAR_{rq/rh} - \Delta E\hat{A}R_{rq/rh})$	0.204***	0.757***	0.916***
	(13.08)	(15.89)	(18.41)
CAC_{oq}	-0.028**	-0.275***	-0.622***
	(-2.03)	(-6.42)	(-9.89)
NOA_{oq}	-0.001	-0.016	-0.034**
	(-0.02)	(-1.43)	(-2.04)
$GrLTNOA_{oq}$	0.002	-0.020	0.032
	(0.24)	(-0.73)	(0.58)
$GrCSALE_{oq}$	-0.001	-0.003	-0.009
	(-0.26)	(-1.01)	(-1.53)
$SHRCHG_{oq}$	-0.023***	-0.059***	-0.100***
	(-3.37)	(-2.61)	(-2.61)
$Beta_{rq-1}$	-0.001	0.006	-0.010**
	(-1.45)	(1.52)	(-2.24)
$logMVE_{rq/rh}$	0.218	1.209	6.147***
	(0.45)	(0.86)	(3.02)
$logBM_{rq/rh}$	0.010***	0.065***	0.071***
	(2.63)	(5.80)	(4.19)
$MOM_{rq/rh}$	0.001	0.010	0.020**
	(0.43)	(1.32)	(2.01)
$RevHORZ_{rh}$			-0.023***
			(-8.32)
N	13,851	13,851	13,606
Adj-R^2	2.1%	4.0%	9.7%

Panel C: 1-, 2-, and 4-quarter post-reversal mean size-adjusted stock returns for the reversals of positive accruals and the reversals of negative accruals.

Period	**Reversals of positive accruals**	**Reversals of negative accruals**
1 quarter	0.51%*	-0.04%
	(1.74)	(-0.11)
2 quarters	0.80%*	-0.64%
	(1.81)	(-1.26)
4 quarters	0.83%	0.49%
	(1.15)	(0.56)
N	8,974	7,670

Panel D: Accrual reversals: association between post-reversal stock returns and originated accruals. Regression (4) of 1-, 2-, and 4-quarter post-reversal size-adjusted stock returns on origination quarter current accruals, CAC_{oq}, growth in long-term net operating assets, *GrLTNOA*, net operating assets, *NOA*, percentage seasonal quarterly cash sales change, *GrCSALE*, net stock issues, *SHRCHG*, stock beta, *Beta*, firm size, *logMVE*, book-to-market ratio, *BM*, and return momentum, *MOM*, for the positive and negative accrual reversals samples pooled together:

$$\begin{aligned} ABRET_{rq+1\ to\ rq+j} &= \alpha_0 + \alpha_1 CAC_{oq} + \alpha_2 GrLTNOA_{rq} + \alpha_3 NOA_{rq} + \alpha_4 GrCSALE_{rq} \\ &+ \alpha_5 SHRCHG_{rq} + \alpha_6 Beta_{rq} + \alpha_7 \log MVE_{rq} + \alpha_8 \log BM_{rq} + \alpha_9 MOM_{rq} + \varepsilon_{rq+1\ to\ rq+j} \end{aligned} \tag{4}$$

	1 quarter	**2 quarters**	**4 quarters**
Intercept	-0.031***	-0.035**	-0.035
	(-2.64)	(-2.03)	(-1.25)
CAC_{oq}	0.003	0.028	-0.089
	(0.10)	(0.51)	(-1.07)
$GrLTNOA_{rq}$	0.034	-0.014	-0.031
	(1.06)	(-0.28)	(-0.43)
NOA_{rq}	0.000	-0.006	-0.034
	(0.02)	(-0.33)	(-1.32)
$GrCSALE_{rq}$	-0.001	0.000	-0.013
	(-0.31)	(0.02)	(-1.41)
$SHRCHG_{rq}$	-0.070***	-0.132***	-0.216***
	(-2.70)	(-3.45)	(-3.81)
$Beta_{rq}$	-0.004	-0.008*	-0.018**
	(-1.16)	(-1.70)	(-2.52)
$logMVE_{rq}$	5.032***	5.181**	8.898***
	(3.72)	(2.55)	(2.84)
$logBM_{rq}$	0.024**	0.051***	0.075***
	(2.40)	(3.32)	(3.23)
MOM_{rq}	0.029***	0.059***	0.054***
	(3.81)	(5.34)	(3.06)
N	14,612	14,612	14,612
Adj-R2	0.4%	0.7%	0.5%

Variable definitions are as follows: seasonal quarterly earnings change, *ΔEAR* is the change in earnings relative to the same quarter in the previous year ($\Delta EAR = EAR_q - EAR_{q-4}$). $\Delta EAR_{q+1\ to\ q+j} = (EAR_{q+1} - EAR_{q-3}) + (EAR_{q+2} - EAR_{q-2}) + (EAR_{q+3} - EAR_{q-1}) + (EAR_{q+4} - EAR_q)$; $ABRET_{q+1\ to\ q+j}$ is the compounded buy-and-hold size-adjusted return for the period *q+1 to q+j*, where j=1, 2, and 4; *RevHORZ* is the number of quarters from the accrual origination until the accrual reversal; ($\Delta EAR_{3d/rq/rh}$-$\Delta E\hat{A}R_{3d/rq/rh}$) is the seasonal quarterly earnings change over the three trading days surrounding the earnings announcement for the reversal quarter (*3d*), over the reversal quarter (*rq*), and over the reversal horizon (*rh*), which are orthogonal to the origination quarter's current accruals, growth in long-term net operating assets, and percentage seasonal quarterly cash sales change. *(oq)* stands for the origination quarter. For a detailed definition of the other variables, please refer to previous Tables.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for a two-tailed t-test.

Table 6 Earnings forecast revisions analysis

Panel A: 1-quarter ahead mean revisions in earnings per share of analysts' forecasts (*REVIS*) and 1-quarter ahead mean revisions in earnings per share of analysts' forecasts, scaled by lagged share price (*REVIS_PRC*) for positive accrual originations, positive accrual reversals, negative accrual originations, and negative accrual reversals.

Group	Originations	Reversals	Difference	t-value of difference
Positive accruals				
REVIS	-0.034	-0.015	-0.019***	-22.39
REVIS_PRC	-0.213	-0.092	-0.121***	-22.09
N	22,919	26,322		
Negative accruals				
REVIS	-0.018	-0.030	0.012***	13.10
REVIS_PRC	-0.127	-0.222	0.095***	14.39
N	24,914	19,723		

Panel B: Regression of revisions in earnings per share analysts' forecasts (*REVIS*) and of revisions in earnings per share analysts' forecasts, scaled by lagged share price (*REVIS_PRC*) on current accruals (C*AC*), the interaction of current accruals with a dummy variable for accrual originations (*D_orig*), seasonal change in cash flow (*CFOCHG*), the interaction of seasonal change in cash flow with a dummy variable for accrual originations (*D_orig*), seasonal change in sales (*SALECHG*), firm size (*logMVE*), and the control variable for new shares issue (*D_SEO*) run for positive accruals (positive accrual originations and negative accrual reversals pooled together) and for negative accruals (negative accrual originations and positive accrual reversals pooled together):

$$REVIS\ /\ REVIS\_PRC_{q+1} = \alpha_0 + \alpha_1 CAC_q + \alpha_2 CAC_q * D\_orig + \alpha_3 CFOCHG_q + \alpha_4 CFOCHG_q * D\_orig + \alpha_5 SALECHG_q + \alpha_6 \log MVE_q + \alpha_7 D\_SEO_q + \varepsilon_{q+1} \quad (7)$$

	Positive accruals		Negative accruals	
	REVIS	**REVIS_PRC**	**REVIS**	**REVIS_PRC**
Intercept	-0.041***	-0.457***	-0.054**	-0.597***
	(-9.95)	(-18.08)	(-11.01)	(-17.48)
CAC_q	0.112***	0.548***	0.111***	1.227***
	(3.77)	(2.82)	(3.23)	(3.97)
CAC_q*D_orig	-0.183***	-0.948***	-0.095**	-0.625*
	(-5.69)	(-4.88)	(-2.24)	(-1.70)
$CFOCHG_q$	0.157***	1.051***	0.190***	1.427***
	(4.73)	(4.71)	(5.59)	(5.02)
$CFOCHG_q$*D_orig	-0.011	-0.105	0.038	0.056
	(-0.22)	(-0.31)	(0.78)	(0.13)
$SALECHG_q$	0.010***	0.066***	0.013***	0.099***
	(4.28)	(4.77)	(5.58)	(6.23)
$logMVE_q$	0.002***	0.043***	0.004***	0.059***
	(3.80)	(13.77)	(4.99)	(14.21)
D_SEO_q	0.005	0.028	-0.005	-0.044
	(1.52)	(1.21)	(-1.05)	(-1.27)
N	45,483	45,483	41,163	41,163
Adj-R^2	1.6%	3.0%	2.1%	3.6%

Variable definitions are as follows: *D_orig* is an indicator variable that takes the value of 1 for accrual origination and 0 otherwise; *REVIS* is the revision of analysts' earnings per share forecasts, calculated as the difference between the last forecast before the accrual origination or accrual reversal quarter and the last forecast before the next after the accrual origination or the accrual reversal quarter; *REVIS_PRC* is the revision of analysts' earnings per share forecasts, scaled by share price and multiplied by 100; *CFOCHG* is the seasonal change in cash flow; *D_SEO* is an indicator variable, which is set to 1 if the stock-split adjusted number of outstanding shares increases by at least 10 percent in the following 12 months.

For a detailed definition of the other variables, please refer to the previous Tables.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for a two-tailed t-test.

Table 7 Accrual-based trading strategy that ex-ante excludes accrual reversals from extreme accrual portfolios

Panel A: 12-month mean size-adjusted stock returns for extreme positive current accruals and extreme negative current accrual firms, divided into three subsamples: (a) firms with extreme positive current accruals (top and bottom two deciles of current accruals); (b) firms with extreme current accruals that are accrual reversals; and (c) firms with extreme current accruals that are non-accrual reversals. Firms with accrual reversals are detected at the time of portfolio formation using the historical data and method presented in Section 3 of the paper.

	All firms with extreme current accruals	**Firms with extreme current accruals that are accrual reversals**	**Firms with extreme current accruals, excluding firms with accrual reversals**
Extreme positive current accruals (top two deciles)	-3.32%***	0.99%	-3.99%***
	(-9.99)	(0.98)	(-11.43)
N	53,092	7,172	45,920
Extreme negative current accruals (bottom two deciles)	2.33%***	0.30%	2.99%***
	(6.75)	(0.50)	(7.25)
N	53,068	13,042	40,027
Hedge return (long in firms with negative accruals and short in firms with positive accruals)	5.65%***	-0.69%	6.98%***
	(11.52)	(-0.62)	(14.11)
t-value of difference in returns between the mean hedge returns 5.65% and 6.98% = 1.95			

Panel B: Regression of 12-month size-adjusted stock returns on extreme current accruals (defined as the top and bottom two deciles of current accruals), *CAC*, the interaction of accruals with a dummy variable for extreme current accruals that are accrual reversals, *D_rev*, net operating assets, *NOA*, growth in long-term net operating assets, *GrLTNOA*, percentage seasonal quarterly cash sales change, *GrCSALE*, net stock issues, *SHRCHG*, stock beta, *Beta*, firm size, *logMVE*, book-to-market ratio, *BM*, and return momentum, *MOM*:

$$ABRET_{q+1\ to\ q+4} = \alpha_0 + \alpha_1 CAC_q + \alpha_2 CAC_q * D\_rev + \alpha_3 NOA_q + \alpha_4 GrLTNOA_q + \alpha_5 GrCSALE_q$$
$$+ \alpha_6 SHRCHG_q + \alpha_7 Beta_q + \alpha_8 \log MVE_q + \alpha_9 \log BM_q + \alpha_{10} MOM_q + \varepsilon_{q+1\ to\ q+4}$$

(8)

Variable	Coefficient
Intercept	-0.028*
	(-1.93)
CAC_q	-0.343***
	(-8.78)
CAC_q*D_*rev*	0.413***
	(5.04)
NOA_q	-0.056***
	(-4.12)
$GrLTNOA_q$	-0.040
	(-1.40)
$GrCSALE_q$	-0.009***
	(-2.99)
$SHRCHG_q$	-0.224***
	(-12.27)
$Beta_q$	-0.023***
	(-5.85)
$logMVE_q$	8.003***
	(4.95)
$logBM_q$	0.104***
	(9.70)
MOM_q	0.048***
	(6.45)
N	84,769
Adj-R^2	1.0%
Tests	
$\alpha_1 = 0$ is rejected at <0.001	
$\alpha_1 + \alpha_2 = 0$ is rejected at 0.351	

Variable definitions are as follows: *D_rev* is an indicator variable that is set to 1 when the extreme accruals reverse in quarter *q* and to 0 for all other observations. Extreme accrual reversals in quarter *q* are detected as follows: extreme negative accrual reversals are current accruals in the top two deciles in quarter *q*, with negative current accruals within the previous 20 quarters, *q-1* to quarter *q-20*, which were at least 50 percent of the positive current accruals, and NWC in the bottom 3 deciles at that quarter; extreme positive accrual reversals are current accruals in the bottom two deciles in quarter *q*, with positive current accruals within the previous 20 quarters, *q-1* to quarter *q-20*, which were at least 50 percent of the negative current accruals, and NWC in the top three deciles at that quarter. For a detailed definition of the other variables, please refer to the previous Tables.

***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for a two-tailed t-test.