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Is the Accruals Anomaly More Persistent in Firms With Weak Internal Controls?

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Abstract

In 1996, Sloan identified the accruals anomaly, in which the negative relationship between the accruals component of current earnings and subsequent stock returns can be exploited to generate excess returns. One would expect the accruals anomaly to dissipate and ultimately disappear as investors take advantage of the now-public information. However, nearly two decades later, it persists as one of the most prominent and contentious anomalies; its magnitude of current and future excess returns still remain controversial. The main reason for its persistence is that extreme accrual firms possess characteristics that are unappealing to most investors. These characteristics, which include insufficient analyst coverage, high idiosyncratic volatility and the presence of institutional constraints, are generally more pronounced in firms with weak internal controls. This paper finds that the accruals anomaly persists at a higher magnitude in firms with weak internal controls. This higher magnitude of excess returns survives the Fama-French five-factor (2015), the Stambaugh-Yuan four-factor (2017) and the Hou, Xue, and Zhang (2015) q-factor models.

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1. Introduction

Once upon a time, investors thought that all you needed to beat the market and earn excess returns was to be smart. This conventional wisdom was turned on its head as developments like the Capital Asset Pricing Model (CAPM) and the Sharpe Ratio popped up. Suddenly, the CAPM and other factor models revealed that all of the "smart" strategies that were generating excess returns were also delivering high risk. The CAPM and its variants reign as the best explanation of returns, forcing investors to scramble to find new ways to beat the market. It also led to a surge in the popularity of the Efficient Market Hypothesis (EMH). The EMH is one of the tenets of modern finance; it states that markets are rational and that asset prices reflect all available information. According to the EMH, stock prices can deviate from their "true" value as long as these deviations are random. If this is true, then one should never be able to generate abnormal returns and beat the market. The EMH has three levels of efficiency: strong-form, semi-strong form, and weak-form. Strong-form efficiency, which states that prices reflect all information, has been rejected by many academics and practitioners including Grossman and Stiglitz (1980). They argue that it is costly to acquire information and if the prices already reflect all the information then no investor has an incentive to collect and trade on the information. If this were true, then there should be no way for the information to be incorporated into the price in the first place.[1] Meanwhile, Bodie, Kane, and Marcus (1998) highlight that under weak-form efficiency technical analysis is useless, and under semi-strong-form efficiency, both technical and fundamental analyses are useless.

In light of these implications, any deviations that cannot be dismissed as random are worth examining. Anomalies involve particular firm characteristics that can be used to forecast returns

[1] Crane, Crotty and Umar (2018) lend support to this argument as they find that when compared to the funds that don't hedge funds that access filings from Edgar have a higher abnormal return of 1.5% per year. Additionally, above median users generate an abnormal return of 2% per year compared to non-users, which means that more intensive information acquisition is related with higher abnormal returns.

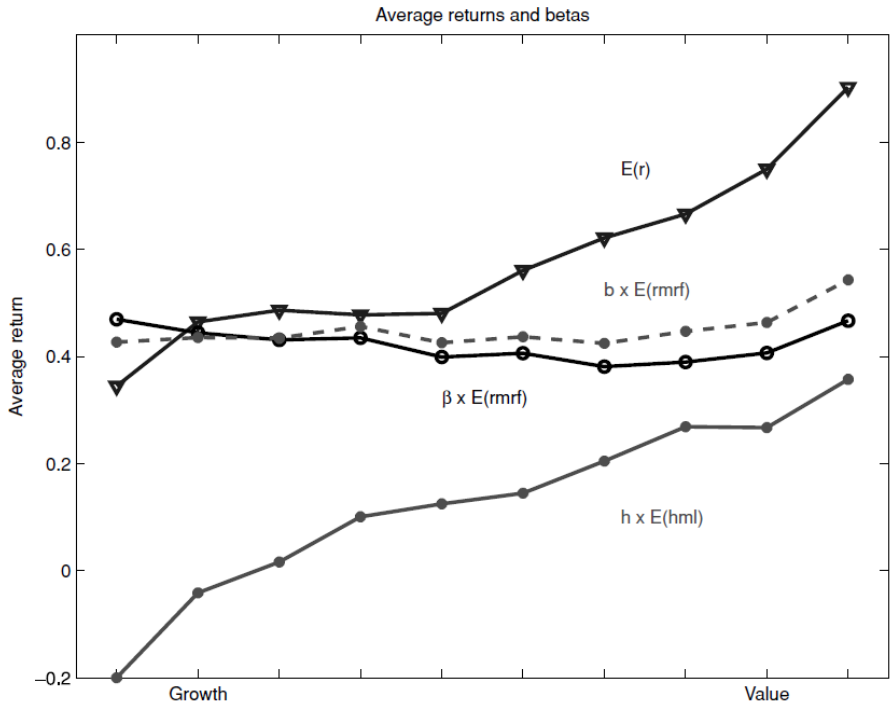
beyond what can be explained using existing factor-based asset pricing models. If empirical results show that anomalies exist, then it implies that either it is possible to earn excess returns by exploiting mispricing or that there are inadequacies in the risk adjustments provided by the underlying asset pricing model. Should the former be true, then its conclusion is controversial as it completely contradicts the efficient market hypothesis (EMH), particularly semi-strong-form efficiency, which states that prices reflect all public information[2].

Figure 1 depicts the average return and factor betas for the value-glamour anomaly, which was one of the most prominent anomalies. Specifically, it shows the factor beta loadings for the Fama-French 10 book-to-market sorted portfolios along with their respective average returns. The average excess return increases from growth, which is represented by a low book-to-market ratio, to value, which is represented by a high book-to-market ratio. It is rational to assume that out-of-favor stocks, whose financial performance has not declined, that have experienced a decrease in their stock price should have higher average returns subsequently. If the EMH were true and CAPM predicted returns accurately, then one would expect these higher average returns to be accompanied with higher risk. The market beta is the proxy for risk in the CAPM. As shown in Figure 1, the market betas for all the portfolios are roughly the same. The higher expected returns appear to move in conjunction with the High-minus-Low (HML) factor, which is the average return on a small and a big value portfolio minus the average return on a small and a big growth portfolio. While the value-glamour anomaly is explained by Fama-French

[2] Jegadeesh and Titman (1993) find that a strategy that buys past winners and sells past losers generates significant excess returns. If this anomaly holds then even weak-form efficiency is rebuffed as it implies that past prices can be used to predict future prices.

three-factor model (1996), Cochrane (2011) notes that a "veritable zoo" of anomaly factors has emerged recently.[3]

Figure 1: Average Returns and Factor Betas for Ten Fama-French Book-to-Market Sorted Portfolios. Monthly Data, 1963-2010. [4,5]



This eruption of anomalies brought new hope for investors as it indicates the possibility of generating higher returns without taking on additional risk. From the perspective of practitioners, the anomalies literature is one of the cornerstones of the multi-trillion dollar quantitative asset management industry. In fact, behemoths like Dimensional Fund Advisors and AQR Capital Management have amassed hundreds of billions of dollars in AUM by successfully exploiting anomalies for profit. Even Burton Malkiel, one of the staunchest proponents of the Efficient Market Hypothesis, the author of *A Random Walk Down Wall Street* and the director

[3] J. H. Cochrane, "Presidential address: Discount rates," Journal of Finance 66, no.4 (2011):1061
[4] This figure is taken from Cochrane (2011), since it is not a core component of this paper and is mostly used for illustrative purposes, it was not replicated in the interest of time.
[5] J. H. Cochrane, "Presidential address: Discount rates," *Journal of Finance* 66, no.4 (2011):1059

emeritus of Vanguard, has recently acknowledged that the market has some inefficiencies. As the Chief Investment Officer for Wealthfront, he is a proponent of their Advanced Indexing approach. The Advanced Indexing strategy exploits the smart beta anomaly to beat the passive approach, which is based on an index weighted by the market capitalization of its stocks. Malkiel championed this passive approach for decades.

The emergence of new anomalies has also benefited academics. As Mohanram (2014) argues, the existence of anomalies will motivate academics to build better models. The emergence of new factor models lends support to his Mohanram. Fama and French (1996, 2015) and Stambaugh and Yuan (2017) have presented factor models that have replaced the CAPM for risk adjustment by significantly reducing the anomaly factors that can be used to predict excess returns. Nevertheless, trading strategies that generate excess return have consistently emerged and persisted. The excess returns earned by these strategies cannot be explained by the prevalent factor-based asset pricing models, as the strategies exploit anomalies like accruals, momentum, and buybacks among others. As a result, anomalies have attracted the attention of both academics and practitioners for at least five decades.

Currently, there are hundreds of documented anomalies, and the number continues to grow. [6] Ronald Coase once said, “If you torture data enough, it will confess”.[7] This quote perfectly summarizes the anomalies literature as most new anomalies cannot be replicated. Harvey (2017), Harvey, Liu, and Zhu (2016), Hou, Xue, and Zhang (2015), Coy (2017) and Cochrane (2011) among others underscore that the anomalies literature is plagued by widespread

[6] Green, Hand and Zhang (2013) examine over 300 strategies, Harvey et al. (2016) find 316 existing factors, and Hou et al. (2017) replicate 447 anomalies.
[7] Ronald Coase, "How should economists choose?" (presentation, The third G. Warren Nutter Lecture in Political Economy, American Enterprise Institute for Public Policy Research, Washinghton, D.C., November 18, 1981)

problems like p-hacking, lack of replicability and publication biases.[8,9] Fama and French (2015), Stambaugh and Yuan (2017), Green, Hand, and Zhang (2017) and Hou et al. (2017) among others have empirically proved that most documented anomalies are not statistically significant, and even significant anomalies have abnormal returns much lower than originally reported. Hou et al. (2017) conducted a large-scale replication study of the entire anomalies literature by testing 447 anomalies. They find that 380 (85%) out of the 447 anomalies are insignificant when a hurdle t-value of 3 is used. This implies that most anomalies are more apparent than real and so they cannot be exploited. More importantly, they show that when the q-factor model is used to explain the significant anomalies only 46 anomalies have significant alphas. The accruals anomaly is one of these 46 anomalies with a monthly alpha of 0.54%. Fama and French (2016) demonstrate that, with two exceptions, the Jegadeesh and Titman (1993) momentum and the Sloan (1996) accruals, the Fama-French five-factor (2015) model shrinks the magnitude of anomaly average returns that are left unexplained by the Fama-French three-factor (1996) model. They attribute this phenomenon to two reasons; the anomaly returns become less abnormal and the returns for different anomalies have similar five-factor exposures, which indicates that they may actually be the same anomaly. Interestingly, Desai, Rajgopal, and Venkatachalam (2004) find that the mispricing attributed to both the value-glamour anomaly and the accruals anomaly can be explained by the same variable, operating flow cash scaled by price.[10] Yet, the current factor models cannot explain the accruals anomaly. Stambaugh and Yuan's (2017) four-factor model explains the returns for almost all of the 73 anomalies tested. The accruals anomaly,

[8] P-hacking refers to the use of data mining techniques to find patterns by tinkering with the sample criteria and test results in the data until insignificant results become statistically significant. Harvey et al. (2016) and Hou et al. (2015) highlight that one can use techniques like multiple testing corrections to eliminate most of the gimmickry.
[9] Harvey et al. (2016) identify two publication biases: it is hard to publish a result stating that the anomaly is statistically insignificant or does not exist in the first place and that it is hard to publish replication studies in finance and economics.
[10] Desai et al. (2004) define operating cash flow as earnings adjusted for depreciation and working capital accruals.

which has a monthly alpha of 0.31% using the Stambaugh and Yuan (2017) four-factor model, is one of seven anomalies that is both statistically and economically significant. An anomaly needs to provide independent information about returns in order to enable academics to construct parsimonious factor models and practitioners to generate excess returns. Green et al. (2017) find that only 12 anomalies provide significant independent information about non-microcap stocks and 23 provide significant independent information about microcap stocks over the period from 1980 to 2014. Additionally, Engelberg, McLean, and Pontiff (2017) examine 97 characteristics and conclude that anomaly returns are driven by biased investor expectations as they reliably predict analyst forecast errors, are seven times higher on earnings announcement days and are two times higher on corporate news days. The existence of anomalies like Frazzini and Pedersen's (2014) betting against beta lend support to the argument that investors engage in suboptimal behavior due to constraints.[11] These findings undermine the EMH as they imply that investors engage in suboptimal behavior due to constraints instead of pricing in information rationally, resulting in the creation and persistence of anomalies.

McLean and Pontiff (2016) show that once an anomaly has been published, there is an increase in trading activity in the anomaly portfolio, which leads to a decay in the returns produced by the strategy. This is supported by Grossman and Stiglitz (1980) and the Adaptive Markets Hypothesis (AMH) proposed by Lo (2004), which cedes that opportunities for arbitrage can exist.[12] Perhaps the old adage that says if something makes money then you won't find it in a

[11] The main implication of the CAPM is that all investors should invest in the portfolio with the highest Sharpe Ratio and lever or de-lever their position according to their risk preferences. However, most investors face constraints and may not be able to use leverage. Frazzini and Pedersen (2014) find that investors overweight risky securities in order to achieve their desired return in the absence of leverage. This suboptimal behavior can be exploited to generate excess returns by constructing a portfolio that holds a levered position in low beta stocks and shorts offsetting portfolio of high beta stocks to achieve a beta of zero.

[12] Lo (2004) extends the EMH to state that prices reflect as much information as demanded by the current environment and the nature and number of the market participants. If the environment is stable then the markets will

published paper, might just be true. Additionally, it is worth noting that most studies that find anomalies do not account for difficulties with implementation. For example, high trading costs and illiquidity might restrict practitioners' abilities to exploit the anomaly to generate excess returns. Fama and French (2015), Stambaugh, Yu and Yuan (2015), Harvey et al. (2016) and Barber and Odean (2013) among others have postulated certain characteristics that would lead an anomaly to persist long after discovery. These characteristics include sufficiently complex strategies, risk that deters price correcting arbitrage, inattention, high trading costs and the presence of institutional constraints among others. Coates and Srinivasan (2014), Ashbaugh-Skaife, Collins, Kinney, and Lafond (2008), Doyle, Ge, and McVay (2007) among others find that firms with weak internal control possess these characteristics. These findings indicate that the magnitude of returns to anomaly strategies should be higher for a portfolio consisting of firms with weak internal controls.

Sloan's (1996) accruals anomaly is one of the most prominent and contentious anomalies. Accruals are generated when accounting decisions cause a difference between book earnings and cash earnings. They can be the result of either earnings management or just normal accounting based on estimates of future firm performance. Accruals are intended to reverse when these expectations are realized so that there is no impact on future earnings. The underlying rationale for the accruals anomaly is that accruals are likely to be less persistent than cash flows because of managerial errors, whether intentional or unintentional, in forecasting future firm performance, which inflates or deflates current accruals. Sloan's (1996) ground-breaking study

be efficient i.e. the EMH is a limit under the AMH. If the environment changes then the existing strategies of investors will be rendered obsolete. The AMH assumes that the strategies will evolve as the investors will keep adapting by trying new strategies until they find one that works either through skill or luck. This means that opportunities for arbitrage can exist, however, whether or not they actually do will be governed by environmental conditions like competition between investors and the number and nature of investors, who are trying to exploit the opportunity.

on the accruals anomaly has spawned considerable research, which has been disseminated among both academics and practitioners. Yet, two decades later, the debate on its persistence and magnitude still endures. Even those who agree that it persists are divided on whether or not the anomaly is a result of market mispricing or an additional source of risk, why it has not been arbitraged away, and whether investors can earn excess returns by exploiting it. In fact, the debate is so extensive that there is even a lack of consensus on how to define and measure accruals. Hou et al. (2017) among others document that various studies have proposed alternative measures and specific types of accruals that these studies claim drive the excess returns.[13] The most notable out of these studies is Hribar and Collins (2002) as it uses information from the cash flow statement to construct Sloan's (1996) accruals. This refined definition of accruals minimizes measurement errors that arise from non-operating activities like acquisitions. Subsequent papers like Hou et al. (2017) that have replicated the accruals anomaly have employed Hribar and Collins' (2002) definition.

This paper's contribution is an examination of whether or not the accruals anomaly persists at a larger magnitude in publicly traded US firms that have weak internal controls. Publicly traded US firms are required to establish internal control systems for financial reporting under the Sarbanes-Oxley Act of 2002 (SOX), which was passed in the wake of scandals like Enron and WorldCom to protect investors from fraudulent accounting practices undertaken by publicly traded firms. Specifically, Section 404 of the SOX requires that the management and auditors of all publicly traded US firms must establish internal control systems for financial reporting and that the management must then disclose their assessment of the company's internal

[13] Hou et al. (2017) replicate seven different types of accruals anomalies, namely, accruals quality, total accruals, operating accruals, discretionary accruals, percent total accruals, percent discretionary accruals, and percent operating accruals. Some of these have been refined by

control systems in the firms' annual reports. Additionally, it mandates that all accounting firms that prepare financial statements for publicly traded firms must attest and report on the management's assessment of the company's internal control systems. It is widely regarded as the most expensive and complicated section of the SOX act. This paper focused on publicly traded US stocks in the post-SOX era, measuring and assessing the magnitude of excess returns to the accruals anomaly using a hedge strategy.

The results indicate that, when compared to the broader market, the anomaly accruals in firms with weak internal controls can be potentially exploited to generate higher excess returns. These excess returns are robust and are likely to persist into the foreseeable future as they cannot be explained by the Fama-French five-factor (2015), the Stambaugh-Yuan four-factor (2017) and the Hou et al. (2015) q-factor models. The rest of this paper is organized as follows: Section 2 reviews the related literature on the accruals anomaly, the reasons for the decay of returns from the strategy, and the various hypotheses on why it might be more pronounced in firms with weak internal controls; Section 3 describes the data, sample formation, and variable construction; Section 4 presents the empirical results and Section 5 concludes.

2. Literature Review

2.1 The Accruals Anomaly

There are two components of earnings, namely, accruals and cash flow. Accruals are accounting adjustments made to earnings that cause book earnings to differ from cash earnings. They can be the result of either earnings management or just standard accounting based on estimates of future business performance and are intended to have a net neutral effect on future earnings after expectations have been realized. Graham and Dodds (1934) and other texts on financial statements analysis highlight the importance of unpacking the information contained in

current earnings. Many renowned investors, including Warren Buffett, who is arguably the most successful disciple of Graham and Dodds (1934), advocate paying attention to the nuances of accounting. When talking about accounting adjustments used to prop up earnings, Buffett once remarked, "Managers thinking about accounting issues should never forget one of Abraham Lincoln's favorite riddles: 'How many legs does a dog have if you call his tail a leg?' The answer: 'Four, because calling a tail a leg does not make it a leg.'"[14] Graham and Dodds (1934) recommend analyzing both the accruals and the cash flow components of current earnings to forecast the future earnings power of a firm. In fact, they champion a five-step process for adjusting current earnings to arrive at earnings power. The underlying rationale for these adjustments is that investors should focus on the recurring components of earnings like cash flow, which is less prone to distortion than net income, to predict earnings power. This distortion is caused as net income is calculated using the accruals system and accruals are less likely to recur in future periods' earnings. They argue that this adjustment should enable investors to detect mispriced securities as most investors tend to fixate on reported earnings as a whole.

Graham and Dodds' (1934) claim that most investors fixate on earnings is backed by Degeorge, Patel, and Zechhauser (1999), who find that executives, boards of directors, analysts and investors consider earnings to be the most important item in the financial reports of public firms. The existing literature on earnings management, summarized by Healy and Wahlen (1999), provides several reasons why managers might exercise their discretion over accounting decisions: build credibility with capital markets, maintain or increase their firms' stock price, advance their careers, earn bonuses and increase the value of their large holdings of stocks and

[14] Charles R. Morris, *The Sages: Warren Buffett, George Soros, Paul Volcker, and the Maelstrom of Markets*.(Minneapolis: PublicAffairs, 2010): 119.

options. Dichev, Graham, Harvey, Rajgopal (2013) and Degeorge et al. (1999), among others, show that earnings management is a rampant problem. Dichev et al. (2013) note that the consensus among CFOs is that at least some firms manage earnings. They document that CFOs believe that about 20% of firms manage earnings in any given period and that 10% of earnings per share (EPS) are typically misrepresented by these firms. Burgstahler and Dichev (1997) and Brown and Caylor (2005), among others, provide evidence to show that firms manage earnings to meet earnings thresholds.[15] Specifically, Burgstahler and Dichev (1997) examine the distribution of reported earnings and find a higher than expected concentration of firms with slightly positive reported earnings, or earnings increases, and a lower than expected concentration of firms with slightly negative reported earnings or earnings decreases. They find that 8-12% of firms with small pre-managed earnings decreases manipulate earnings to achieve reported earnings increases, and 30-44% of firms with small pre-managed losses manage earnings to create positive earnings.[16] Brown and Caylor (2005) find that capital markets reward or penalize firms for meeting or missing analyst forecasts respectively. These findings indicate that investors can gain an edge by analyzing accruals as there is a high probability that managers engage in activities that have a distortionary impact on earnings

There is a large volume of literature summarized by Healy and Wahlen (1999) that documents the use of accruals to manage earnings in order to meet earnings thresholds. Sloan (1996), Xie (2001) and Allen, Larson, and Sloan (2013), among others, provide empirical evidence to lend support to Graham and Dodds' (1934) assertion that the accruals component of earnings has a significantly lower persistence than the cash flow component. While both

[15] Burgstahler and Dichev (1997) find that firms manage reported earnings to avoid earnings decreases and losses and Brown and Caylor (2005) find that firms manage earnings to avoid negative earnings surprises.
[16] Burgstahler and Dichev (1997) do not examine analyst forecasts

components contribute to current earnings, earnings performance is less likely to persist if the current earnings primarily consist of accruals. In fact, Allen, Larson, and Sloan (2013) show that extremely positive accruals contain a significant amount of estimation error and that they are followed by a disproportionately high occurrence and magnitude of negative reversals.

Sloan (1996) finds that future stock returns are inversely correlated with the magnitude of accruals. So firms, whose current earnings that have a high accruals component are predicted to earn negative abnormal returns. Firms in the highest decile portfolio, constructed by sorting on the total dollar value of accruals scaled by assets, earn size-adjusted abnormal returns of -5.5%. Moreover, firms with low accruals earn positive size-adjusted excess returns that range up to 4.9% for the firms in the lowest decile portfolio. Therefore, he finds that unlike what is expected by the traditional Efficient Market hypothesis, stock prices do not reflect all publicly available information. Specifically, they do not price in the information contained in the accruals component of current earnings, which are more transitory in nature than the cash flow component due to the expected reversal of accruals. Sloan (1996) measures total dollar accruals as the annual change in non-cash working capital minus depreciation and amortization expense. So, total dollar accruals for a year *t* are calculated as

$$Accruals_{it} = (\Delta CA_{it} - \Delta Cash_{it}) - (\Delta CL_{it} - \Delta DLC_{it} - \Delta TP_{it}) - Dep_{it} \qquad (1)$$

where *CA* represents total current assets, *Cash* represents cash and cash equivalents, *CL* represents current liabilities, *DLC* represents debt included in current liabilities, *TP* represents income taxes payable and *Dep* represents depreciation and amortization expense. Total dollar accruals are scaled by average annual total assets. He constructs portfolios every year from 1962 to 1991 by sorting firms into deciles based on the magnitude of accruals in the current year. He provides evidence that a trading strategy that constructs a hedge portfolio by taking a long

position in the lowest decile accrual portfolio and an offsetting short position in the highest decile accrual portfolio, earns size adjusted excess returns of 10.4% in the year after its construction. This strategy capitalizes on investors' ignorance of the differential persistence of the components of current earnings due to the reversal of accruals within one year. Sloan's claim that investors misprice accruals is supported by Bradshaw, Richardson, and Sloan (2001), who find that even sophisticated agents like analysts misprice accruals. He also documents that firms with higher accruals tend to have higher earnings and that accruals and net operating cash flow are negatively related. These characteristics should further increase the magnitude of abnormal returns earned by the trading strategy if investors are fooled by the non-recurring earnings distortions caused by accruals. In other words, investors price in a higher persistence for earnings performance than they should, thereby overvaluing or undervaluing firms with high or low accruals respectively. This inverse relationship between accruals and subsequent stock returns is known as the accruals anomaly.

2.2 **The Magnitude and Persistence of the Accruals Anomaly**

Even after two decades, Fama and French (2015), Stambaugh and Yuan (2017) and Hou et al. (2015, 2017), among others, find that while the magnitude of abnormal returns has shrunk, the accruals anomaly is still statistically significant and cannot be explained by the commonly used factor models. Fama and French (2015) note that the Fama-French five-factor model shrinks average returns of anomaly strategies left unexplained by the Fama-French three-factor model with only two exceptions, Sloan (1996) accruals and Jegadeesh and Titman (1993) momentum. Contrary to expectations, when compared to the Fama-French three-factor model, the magnitude of excess returns generated by the accruals anomaly that cannot be explained by the Fama-French five-factor model is actually higher. This is mainly caused by microcaps, which have negative RMW (Robust minus Weak, which is the profitability factor) slopes but their

predicted low returns do not materialize. Hou et al. (2015) find that portfolios constructed by sorting on accruals produce average returns that cannot be explained by their model. Sloan (1996) notes that firms with high accruals tend to have higher earnings, which makes the high accrual firms appear more profitable. These firms load up more heavily on the return on equity (RoE) factor of Hou et al.'s (2015) model than firms with low accruals, thereby decreasing the overall explanatory power of the model.

Livnat and Espinosa (2008) find that generally operating cash flows is a better predictor of future abnormal return in the next quarter. However, they find that four consecutive quarters of accruals are significantly associated with future excess returns even after controlling for the effects of operating cash flow. This effect is only observable when the portfolio holding period is four quarters and only for the fourth fiscal quarter. Operating cash flows is a better predictor in all other quarters. The fourth fiscal quarter results are reported after the annual audit is conducted and an independent auditor verifies the accruals. The returns for a buy and hold portfolio, held for one year ending in the fourth fiscal quarter, are 9.9%, which is close to the return of 10.4% documented by Sloan (1996). The dominance of accruals in predicting returns in the fourth fiscal quarter is consistent with Sloan's (1996) findings that investors don't take into account the lower persistence of accruals.

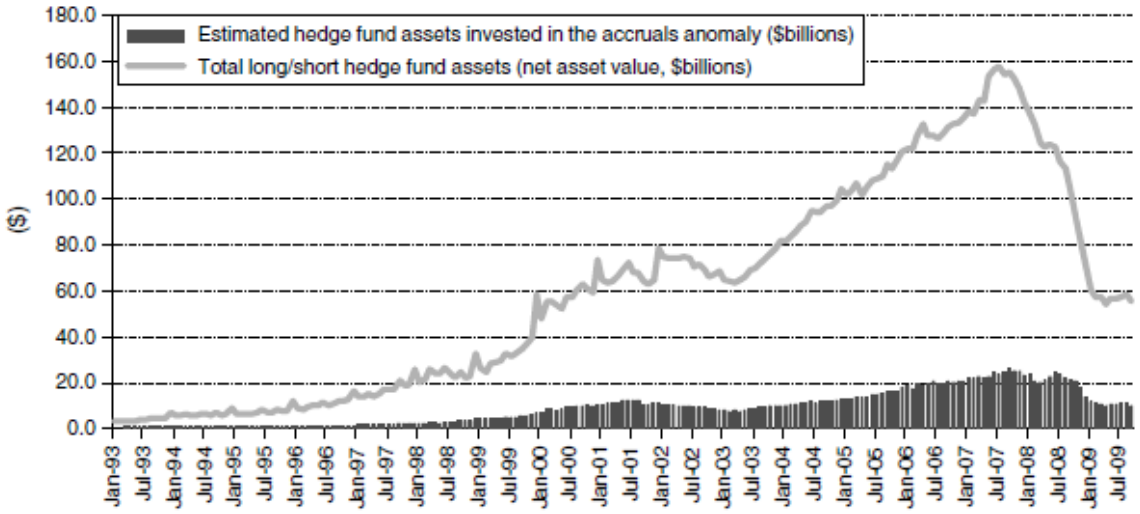
Collins, Gong, and Hribar (2003) show that companies with a higher percentage of institutional investors, who are considered more sophisticated relative to individual investors, have a weaker accruals anomaly. This evidence would lend support to Sloan's (1996) claim that the accruals anomaly is a result of investors' inability to correctly price in the information contained in current earnings. Green et al. (2017) document that there is a sharp drop in mean hedge returns from anomaly strategies for the group of 94 anomalies they studied post-2003. The

mean hedge return for non-microcaps is insignificantly different from zero. Even though the mean hedge return is positive for microcap stocks, it is two-thirds less than what it was pre-2003. They note that a number of regulatory changes in the trading and information environment, which occurred between July 2002 and June 2003, made it significantly easier to implement quantitative long/short trading strategies. These include the implementation of the Sarbanes-Oxley Act, the acceleration of filing requirements for 10-Qs and 10-Ks, and the introduction of auto-quoting by the NYSE. These changes made it significantly easier for investors to exploit anomalies to generate excess returns. This massive uptick in the AUM chasing anomalies shrunk the magnitude of excess returns earned by anomaly strategies to the point where most of them disappeared.

Novy-Marx and Velikov (2016) document the taxonomy of transaction costs and a maximum capacity for the most prominent anomalies. They find that factoring in trading costs has minimal impact on the Sharpe ratios for low turnover strategies, even for microcaps. However, the accruals anomaly is an exception as its net Sharpe ratio drops significantly. They estimate that, on the long and short sides, the accruals anomaly can handle a maximum capacity of around $10 billion each before the strategy becomes unprofitable. Green, Hand, and Soliman (2011) found that the returns to trading strategies based on Sloan's strategy (1996) have decayed over the years due to the rise in trading and capital invested by hedge funds. They estimated the amount of capital deployed to the accruals anomaly by calculating style weights for funds based on the funds' monthly returns. These style weights are used as a proxy for the percentage of the total assets deployed to exploit the accruals anomaly by the fund. Figure 2 shows that Green et al.'s (2011) estimate of hedge fund assets invested in implementing the accruals anomaly strategy exceeded the maximum capacity proposed by Novy-Marx and Velikov (2016) in early

2006 before dropping back down in late 2008. This increase in assets attempting to exploit the accruals anomaly coincides with the decrease in the magnitude of returns to the accruals anomaly documented by other studies. The drop in assets is consistent with the AMH as it indicates that the excess returns to the strategy have dissipated as the number and nature of investors attracted to it has evolved. The relatively low scalability, in terms of the assets that can be deployed, of the excess returns generated by the accrual anomaly creates a significant first mover advantage. Moreover, it makes it unsuitable for large institutional investors as they might render the strategy unprofitable if they deploy a high proportion of their assets under management (AUM).

Figure 2: Estimated Hedge Fund Assets Invested in Implementing the Accruals Anomaly Strategy.[17]



Allen, Larson, and Sloan (2013) show that extreme positive accruals contain a significant amount of estimation error and that they are followed by a disproportionately high occurrence and magnitude of negative reversals. Thus, if financial analysts understand the predictable reversal in accruals and incorporate this in their cash flow and earnings forecasts, then there should be a decrease in the accruals mispricing as cash flow forecasts become more common.

[17] John Green, Jeremiah Hand, and Mark Soliman, "Going, going, gone? The apparent demise of the accruals anomaly," *Management Science* 57 (2011): 814.

Brown and Caylor (2005) find a significant increase in the number of analysts, the number of firms followed by analysts, and the media coverage of analysts' forecasts over their sample period. Most importantly, they find that the relative accuracy of analysts' quarterly earnings forecasts has become both more accurate and more precise. Mohanram (2014) notes that while traditionally analysts focused most of their attention on predicting earnings, a significant number of them started issuing cash flow forecasts post-2001. In fact, the proportion of US firms in the IBES database with at least one cash flow forecast increased dramatically from less than 10% before 2001 to 54% in 2005. Furthermore, he finds that close to 60% of analysts who issue any kind of forecast issue cash flow forecasts. While Bradshaw et al. (2001) find that analysts misprice accruals, it is important to note that their sample period was before cash flow forecasts were prevalent. McInnis and Collins (2011) find that firms are less likely to manipulate accruals if the analysts covering them issue cash flow forecasts. DeFond and Hung (2003) find that firms with both cash flow and earnings forecasts typically have larger accruals, higher earnings volatility, and more heterogeneous accounting choices relative to their industry peers. Most importantly, they show that analysts' cash flow forecasts are not simple adjustments of the earnings forecasts for routine items like depreciation and tax. Instead, they are the result of sophisticated models that predict accruals. Therefore, the cash flow forecasts, in addition to earnings forecasts, should help eliminate mispricing by enabling investors to gain a better understanding of the transitory nature of the earnings of the firms due to the accruals component. The time period when cash flow forecasts became more common, post-2001, coincides with the time period when the magnitude of returns to the accruals anomaly started shrinking, during the early 2000s. All of these factors may have prompted investors to pay more attention to analysts' forecasts, which began intrinsically pricing in accruals starting in the early 2000s. This explosion

in the number of analysts and cash flow forecasts should have enabled investors to better understand the transitory nature of accruals, thereby, reducing mispricing.

Collins et al. (2003) document that institutional investors react to information about accruals by holding relatively large positions in low accruals firms and low positions in high accruals firms. One would expect that since institutional investors are aware of and react to information about accruals that they would exploit it for excess returns causing them to shrink and eventually disappear. Yet, even though the magnitude of excess returns may have diminished, the accruals anomaly still persists. Lev and Nissim (2006), Mashruwala, Rajan, and Shevlin (2006), among others, have documented characteristics of firms with high accruals. These firms are relatively small, have a low share price, low book-to-market ratio, high trading costs, low liquidity and high idiosyncratic volatility. Lev and Nissim (2006) document that investors prefer to trade in firms that are large, have a high share price, and high book-to-market ratios. Despite this mismatch between the characteristics preferred by institutional investors and those possessed by firms with weak internal controls, it is doubtful that the accruals anomaly persists solely due to this mismatch. While institutional investors may avoid extreme accruals firms due to constraints like prudent-man concerns, structural barriers and liquidity, Lev and Nissim (2006) hypothesize that given the relative simplicity of executing a hedge strategy, one would expect individual investors to exploit the accruals anomaly.[18] However, they find that there are significant transaction costs associated with implementing an accruals strategy, which includes a bigger bid-ask spread, the price impact of trading in small and relatively illiquid firms, and commissions. These transactions costs are higher for individual investors as they are related

[18] Green et al. (2011) document that institutional investors face structural barriers like restrictions on short selling, fiduciary responsibility, restrictions on leverage, litigation risk, and the requirement to benchmark performance that prevent them from exploiting the accruals anomaly.

to the number of securities in the portfolio. If the investment amount is held constant then the transaction costs increase with an increase in the number of securities as most individual investors have to incur a fixed cost per transaction.[19] Figure 3 depicts the statistical significance of the relationship between the number of firms in the portfolio and excess returns by it. Excess returns are calculated as the difference between the firm's returns and the return on a matched portfolio constructed by sorting on the firm size and book-to-market quintiles. Figure 3 plots the mean t-statistic of the excess portfolio return, calculated over 500 replications from 1965-2002, as a function of the number of securities in the portfolio.

Figure 4 plots the mean of the relative frequency of years, calculated over 500 replications from 1965-2002, in which the accruals strategy earned positive excess returns as a function of the number of firms in the portfolio. Even though the mean excess return earned by the portfolio's over 500 replications is 8.9%, Figure 3 and Figure 4 demonstrate that statistical significance and frequency of positive excess returns have a strong positive relationship with the number of firms in the portfolio. In light of these findings, the accruals anomaly will persist until investors are freed from the onerous costs and constraints that currently discourage them from exploiting it.

[19] Most brokerages like TD Ameritrade, Charles Schwab and Fidelity charge a flat fee per trade. The emergence of recent free trading applications like Robinhood may help alleviate some of the trading costs incurred by individual investors implementing the accruals anomaly as the holding period is one year. These platforms have dramatically lowered the costs incurred by investors by eliminating commissions and allowing investors to buy fractional shares. Thus, they hold the potential to disrupt the capital markets in a way that permanently changes the information and trading environment by allowing investors of all sorts to engage in strategies like the accruals anomaly that have traditionally required scale. If this revolution takes off then it will have a significant impact on the efficiency of the stock market to the point where it is unlikely that the pre-App trading era returns will ever exist again.

Figure 3: The Statistical Significance of a Profitable Accruals Strategy as a Function of Portfolio Size.[20]

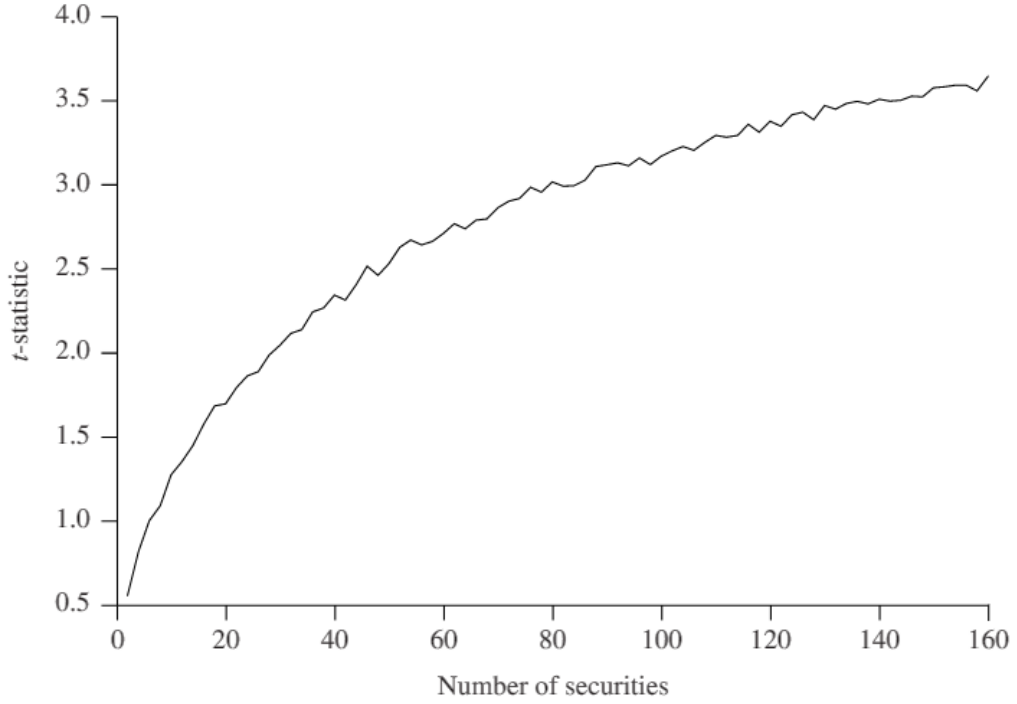
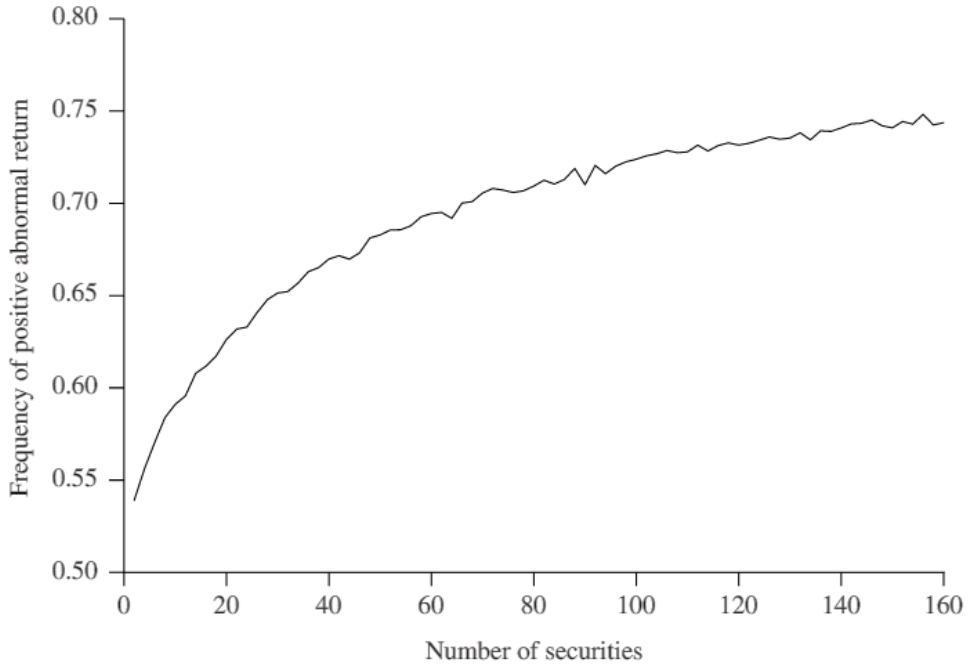


Figure 4: Probability of Positive Abnormal Return from Trading on Accruals Information as a Function of Portfolio Size[21]



[20] B. Lev, and D. Nissim, "The persistence of the accruals anomaly," *Contemporary Accounting Research* 23, no.1 (2006): 220.

[21] B. Lev, and D. Nissim, "The persistence of the accruals anomaly," *Contemporary Accounting Research* 23, no.1 (2006): 221.

Xie (2001) constructs portfolios based on abnormal and normal accruals calculated using the Jones model. He finds that the market overprices abnormal accruals, which are mostly generated due to the exercise of managers' accounting discretion. Graham et al (2005) find that managers have a tendency to engage in real earnings management instead of accounting adjustments after the Enron scandal, especially after the implementation of SOX. Coates and Srinivasan (2014) document that a number of papers provide evidence that accounting quality improved for publicly traded US firms post-2002. They also note that accruals-based earnings management increases steadily from 1987 to 2002 and then declines significantly. Singer and You (2011) find that the implementation of SOX Section 404 improved earnings reliability as it helped reduce intentional misstatements. They find that by using current earnings for the compliant firms compared to non-compliant firms that there is a significantly larger improvement in the predictability of future firm performance. They also document that investors have higher confidence in the financial reports of compliant firms and that investors view the accounting earnings to be more useful in their decision-making process post-SOX. They also find that investors react more strongly to the earnings surprises of compliant firms than non-compliant ones post SOX Section 404. These findings can explain the decrease in the magnitude of abnormal returns earned by trading strategies based on the accruals anomaly post-2003.

The temporal confluence of all these causes makes it hard to distinguish which factors are actually responsible for the decrease in the magnitude of the accrual anomaly. These changes in the information and trading environment have increased arbitrage activity and the efficiency of the stock market to the point where it is unlikely that the pre-2003 returns to the accruals anomaly will resurface. However, these findings have a few implications about why the accruals anomaly might persist at a higher magnitude in firms with weak internal controls. It is safe to

rule out the requirement of a sufficiently complex strategy as Sloan (1996) details a fairly simple one that can be implemented by investors to exploit the accruals anomaly. Therefore, either investors do not pay enough attention to the information in current earnings, namely the nature and magnitude of accruals, as suggested by Sloan (1996), or that there are other constraints that prevent arbitrage. Coates and Srinivasan (2014) have shown that firms with weak internal controls possess both of these characteristics.

2.3 Characteristics of Firms with Weak Internal Controls

Returns to the accruals anomaly strategy started shrinking in the early 2000s. One of the major developments around that period was the passage of the Sarbanes-Oxley Act (SOX) in 2002. SOX was intended to improve the quality of audit and financial reporting of publicly traded companies in the US. Coates and Srinivasan (2014), who review over 120 papers to evaluate the impact on SOX, find that the quality of financial reporting does appear to have improved post-SOX. Arping and Sautner (2013) lend support to this claim as they find a reduction in analyst forecast error and dispersion for European firms cross-listed in the US and subject to SOX relative to matched foreign firms not cross-listed in the US. Coates and Srinivasan (2014) document that a Financial Executives Research Foundation survey in 2005 found that 83% of large company CFOs agreed that SOX had increased investor confidence.

One of the core components of SOX is Section 404, which mandates that publicly traded companies need to get an audit firm's attestation over their internal control systems. While firms can still choose any internal control system that they like, SOX Section 404 forces them to disclose any internal control weaknesses. Notably, SOX does not require firms to fix these internal weaknesses, it only requires them to report their existence as part of their own

disclosures. The regulators rely on the fact that market forces and litigation risk will pressure firms to improve their internal control systems. Johnstone, Li, and Rupley (2011) find that 733 companies disclosed internal control weaknesses from 2004 to 2006. While a large proportion (59%) of these firms resolved the weakness, 30% of these firms continued to disclose the same internal control weaknesses even after three years. Thus, the market forces and litigation risk do not have as strong an effect as expected. Furthermore, Rice and Weber (2012) find that a significant proportion of firms fail to report material weaknesses when they exist. Only 32.4% of firms that subsequently made a material restatement previously reported a material weakness. Consequently, almost two-thirds of these firms that did file a restatement did not report the internal control weakness when it existed. These results imply that for a significant number of firms, SOX's Section 404 functions in part in a "comply or explain" fashion instead of actually leading to improvements to corporate governance. Additionally, Rice, Weber, and Wu (2013) find that there are weak incentives for timely reporting of Section 404 weaknesses. They find that firms that report internal control weaknesses in a restatement instead of when it existed are less likely to have class action lawsuits, SEC sanctions, and management and auditor turnover, compared to firms that had a restatement which previously reported the internal control weakness. As a result, there are incentives for the existence of a systematic bias that encourages firms not to identify or disclose an internal control weakness for as long as they can get away with it. Thus, the sample of studies, including this paper, might not include the entire population of firms that suffer from weak internal controls.

Hirshleifer, Hsu, and Li (2013) find that anomalies matter more for low attention and hard-to-value stocks. They use size and analyst coverage as proxies for attention, and firm age, turnover and idiosyncratic volatility as proxies for valuation uncertainty. Kim, Song, and Zhang

(2009) find that analysts are less likely to follow firms with weak internal controls. They find that internal control quality is inversely related to analysts' forecast error and dispersion. They also find that the convergence of analysts' beliefs about a firm's future performance after the release of current earnings reports is higher for firms with effective internal controls than for those with weak internal controls. Singer and You (2011) find that investors react more strongly to the earnings surprises of compliant firms than non-compliant firms post-SOX Section 404. Ashbaugh-Skaife et al (2008) and Doyle et al (2007) find that internal control weakness leads to lower quality accruals. They argue that this happens because weak internal controls can lead to intentional misstatements. This is backed by Singer and You (2011), who find that SOX Section 404 helped reduce intentional misstatements, which contributed to an improvement in earnings reliability. They find that there is a significantly larger improvement in the predictability of future firm performance using current earnings for the compliant firms compared to non-compliant ones. They document that investors have higher confidence in the financial reports of compliant firms and that investors view the accounting earnings to be more useful in their decision-making process post-SOX. These results imply that the quality of financial reporting is associated not only with the quality of the information itself but also with the quality of the firm's internal control system.

Coates and Srinivasan (2014) document that a number of papers provide evidence that accounting quality improved for publicly traded US firms post-2002. They also note that accruals-based earnings management increases steadily from 1987 to 2002 and then declines significantly. They document that studies show that filers who are just above the $75 million exemption from Section 404 had significantly lower accruals in 2004 compared to firms just below the threshold. Thus, firms with weak internal controls possess characteristics that lead to a

higher magnitude of the accruals anomaly. These characteristics include a higher amount and lower quality of accruals, and lower quality of financial reporting and inattention from investors.

3. Data and Methodology

This paper seeks to examine the magnitude of hedge returns to the accruals anomaly in publicly traded US firms with weak internal controls. It measures and assesses the post-SOX behavior of hedge returns to the accruals anomaly in publicly traded US stocks. The sample consists of 486,167 firm-months over the period that spans from January 2004 to December 2017. It includes all publicly traded companies on the NYSE, AMEX, and NASDAQ that have the requisite data available. Daily and monthly prices, holding period returns and other market data are collected from CRSP. All the accounting information that is required for variable construction is collected from the quarterly file of Compustat Point-in-Time. Information about analyst forecasts is obtained from I/B/E/S. AuditAnalytics is used to procure the data contained in the internal control disclosures filed by firms. The Fama-French five-factor and risk-free rate data are collected from Kenneth French's website. The Stambaugh-Yuan four-factor model data is acquired from Yu Yuan's website. The Pastor-Stambaugh liquidity factors are collected from Robert Stambaugh's website. The q-factor model data is obtained by emailing Lu Zhang.[22]

The report date of quarterly earnings is obtained from the quarterly files of Compustat Point-in-Time. Portfolios are constructed one month after the month that quarterly earnings are reported. Additionally, Compustat Point-in-Time reports only the information that is available to investors at a given point in time. This makes it more suitable as it avoids some of the look-

[22] Lu Zhang can be contacted at zhang.1868@osu.edu.

ahead biases that can be present when financial statement data is obtained from regular Compustat.

3.1 Variable Definitions

The total dollar value of accruals is calculated using the cash flow measure provided by Hribar and Collins (2002):

$$Accruals_{it} = NI_{it} - OANCF_{it} \qquad (2)$$

where NI represents net income and OANCF represents net cash flow from operations. The total dollar value of accruals is scaled by the average total assets of the firm.

While Sloan is the seminal study and its prominence suggests that any trading strategy that exploits the accruals anomaly might be influenced by it to some degree. This paper deliberately uses Hribar and Collins' (2002) definition for construction of accruals instead of Sloan's (1996) for two reasons. Firstly, this paper seeks to avoid calculating accruals using an alternative definition to try and eliminate data-snooping biases that might arise. While numerous papers have focused on specific types of accruals or refined the definition of accruals provided by Sloan (1996), the returns from all of these strategies are explained by the recent crop of factor models (Hou et al (2015), Fama and French (2015) and Stambaugh and Yaun (2017)). This paper follows Hou et al. (2017), who use Hribar and Collins' (2002) definition to measure accruals for the Sloan (1996) instead of Sloan's (1996) own definition post-1988. They underscore that this switch is crucial as it minimizes measurement errors that can arise from non-operating activities like acquisitions. It should be noted that Fama and French (2015) used their own definition, which measured accruals as the change in operating working capital per split-adjusted share from year *t-2* to year *t*-1 scaled by book equity per share in year *t-1*. While there is still a lack of clear consensus, this paper believes that it is apt to use the cash flow measure as defined by Hribar and

Collins (2002) as it has been documented to reduce measurement error in comparison to the balance sheet measure contributed by Sloan (1996). Secondly, Green et al. (2011) note that hedge funds apply far more sophisticated approaches than reported in the academic literature. Additionally, DeFond and Hung (2003) show that analysts' cash flow forecasts they are the result of sophisticated models that predict accruals instead of just simple adjustments of the earnings forecasts for routine items like depreciation and tax. Thus, it is a reasonable to assume that hedge funds that trade on the accruals anomaly probably employ a more sophisticated methodology too. So, any influence that Sloan (1996) had on hedge strategies has probably disappeared as they came up with more refined definitions. Additionally, it is assumed that these hedge funds use a cash flow measure instead of a balance sheet measure as it has been widely documented to reduce the measurement error generated by non-operating activities. While under ideal circumstances this paper would have liked to measure accruals using the same methodology as practitioners, these naïve assumptions are necessary as this paper has no way of identifying and replicating those more refined approaches. It merely serves as a preliminary investigation into the magnitude of returns earned by the accruals anomaly in the sample of firms that have weak internal controls.

Sloan (1996) constructed portfolios once a year on June 1 of year *t* using only firms with a December 31 fiscal year end. Green et al. (2011) highlight that the accruals anomaly has attracted the attention of various large investment entities, who have deployed a considerable amount of AUM to exploit it. They state that sophisticated investors are unlikely to ignore quarterly data. The fact that most sophisticated investors go to great lengths to uncover information and have access to powerful databases like alternative data sources like Ayasdi lends

support to this claim.[23] Green et al. (2011) construct an applied approach, in which they rebalance long/short positions monthly rather than annually. They construct hedge portfolio using a value-weighted basis. They only use the largest 3,000 firms to construct the portfolios.

This paper follows Hou et al. (2017) methodology for replicating the accruals anomaly. Previous studies have imposed restrictions on the minimum cutoff for the share price of a firm like $1 or $3 and have dropped firms that don't meet it. Following, Hou et al. (2017), this paper doesn't employ any such minimum cutoff for the share price of the firm for inclusion in the sample. It also doesn't restrict the sample for portfolio construction to firms that meet a certain size cutoff. This is done to maximize the sample size as Lev and Nissim (2006) document that extreme accruals firms have low share prices and are relatively smaller. Additionally, Table 2 shows that firms with weak internal controls also possess these characteristics. Thus, this paper's sample contains a larger number of firms with weak internal controls and extreme accruals firms. Since this paper is a preliminary investigation into whether or not the accruals anomaly can be exploited in firms with weak internal controls, harsh restrictions are not imposed initially. Additionally, these restrictions weren't imposed by Hou et al. (2017), who replicate 447 anomalies, either. Following Hou et al. and prior literature on the accruals anomaly, financial firms are excluded as the same definition cannot be used to calculate accruals for them. The monthly returns obtained from CRSP are adjusted for delisting wherever it is necessary. Following Green et al. (2011), delisting returns are set to -35% for NYSE/AMEX firms and -55% for NASDAQ firms if they are missing. All stocks are sorted into deciles at the end of each month *t* based on either accruals or size calculated using the values from month *t -1*. The

[23] Ayasdi is a machine learning company that allows investors to access alternative datasets like satellite data that allows investors to take informed bets on commodities by analyzing crop and weather data or estimate metrics like Sales at retailers by monitoring the number of cars in their parking lots.

portfolios are constructed using an value-weighted approach, where the weights are the market value of equity of every firm in a portfolio. When constructing monthly variables like accruals that rely on quarterly items from Compustat Point-in-Time, this paper uses the values reported for the last quarter for which reported financial statements are available.

This paper uses the auditor opinion of internal control quality under SOX section 404 as Ashbaugh et al. (2008) highlight that it is an unbiased signal about the effectiveness of a firm's internal control system from an independent third party. Additionally, Rice and Weber (2012, 2013), highlight that firms have weak incentives to report internal control weaknesses when they exist and only a third of the firms may not have reported internal control weakness in their original disclosure for that period. This has implications for any paper, including this one that examines firms with weak internal controls as they will not have access to the entire population of firms with weak internal controls at any given point of time without being exposed to look-ahead bias. Accordingly, firms that file a restatement for a period are excluded from the sample for that period.

This paper follows Green et al. (2011) and constructs AGG_RANK, AGG_DIFF, AGG_RELPERSIST, AGG_IVOL, AGG_PRC, AGG_TRADING and TIME. All of these variables are computed every month t using data from month t-1. TIME =0.01 in January 2004 and increases by 0.01 through December 2017. AGG_TRADING is the market cap-weighted average of TRADINGit, which is the log of extreme accruals firm i's average daily trading for the month t-1. Idiosyncratic volatility is chosen as one of the explanatory variables as Green et al. (2011) is use it in their model, which finds that the magnitude of the accruals anomaly has shrunk over time. AGG_IVOLit is the market cap-weighted average of IVOLit, which is the log of the standard deviation of residuals from a times series market model regression of the daily

returns of extreme accruals firm i's stock on the CRSP value-weighted index over the month t-1. This paper calculates IVOLit using a Fama-French five-factor model regression instead of using the market model, which was used by Green et al. (2011). Additionally, Stambaugh, Yu, and Yuan (2015) find that stocks with higher idiosyncratic risk have stronger anomaly returns as idiosyncratic risk deters price-correcting arbitrage. Mashruwala et al. (2006) lend support to Stambaugh and Yuan's (2015) findings as they provide evidence that the accruals anomaly is stronger among stocks with high idiosyncratic volatility. AGG_PRC_t is the equally weighted average of $PRICE_{it}$, which is the log of extreme accruals firm *i*'s average price for the month *t-1*. AGG_DIFF is the difference between the market cap–weighted average of accruals in the highest accruals decile and the market cap–weighted average of accruals in the lowest accruals decile sorted on accruals from month *t-1* every month *t*. AGG_RELPERSIST is $\beta_{ACCRUALS}$ / $\beta_{CASHFLOW}$ where $\beta_{ACCRUALS}$ and $\beta_{CASHFLOW}$ are the estimated coefficients in the following yearly cross-sectional regression:

$$\frac{IB_{i,t+1}}{AVGAT_{i,t+1}} = INT_t + \beta\text{ACCRUALS}_t \times \frac{ACCRUALS_{it}}{AVGAT_{it}} + \beta\text{CASHFLOW}_t \times \frac{CASHFLOW_{it}}{AVGAT_{it}} + \varepsilon_{it} \qquad (3)$$

where IB represents annual income before extraordinary items, CF represents annual operating cash flows, and ACCRUALS is measured as IB minus CF. AVGAT is average annual total assets, and INT is an intercept. The variables are winsorized at the 1% level every year to adjust for outliers.

3.2 Summary Statistics

Table 1 provides descriptive statistics for selected characteristics for the ten decile portfolios that are constructed by sorting on the magnitude of accruals. Firms are sorted into deciles at the end of each month t based on either accruals, which are calculated using the values from month t -1. Firms in the extreme accruals deciles are smaller in size relative to the firms in

the other deciles. They are also much less profitable as measured by net income and they have significantly lower net operating cash flow. This is consistent with prior literature, which states that there is a negative association between the magnitude of accruals and cash flow. The average net operating cash flow falls as we move towards the extreme accruals firms. The extreme accruals firms are followed by a fewer number of analysts on average. A smaller percentage of the analysts that cover the extreme decile firms issue cash flow forecasts compared to analysts covering stocks in other deciles. So, these descriptive statistics support the findings of Hirshleifer et al.'s (2013), who use size and analyst coverage as proxies for attention, findings that anomalies matter more for low attention and hard-to-value firms. Extreme accruals firms are relatively smaller firms that suffer from inattention due to lower analyst coverage. Additionally, the accrual component of current earnings far outweighs the cash flow component of current earnings.

Table 1: Mean (Median) Values of Selected Characteristics for the Ten Portfolios Constructed Monthly by Sorting on the Magnitude of Accruals

	Portfolio Accrual Ranking									
	Lowest	2	3	4	5	6	7	8	9	Highest
Market Cap	$1,898 ($244)	$3,732 ($454)	$4,857 ($596)	$5,766 ($742)	$6,620 ($815)	$6,052 ($794)	$5,385 ($738)	$4,201 ($600)	$2,923 ($440)	$1,753 ($262)
Accruals[a]	-0.09 (-0.06)	-0.03 (-0.03)	-0.02 (-0.01)	-0.01 (-0.01)	-0.00 (-0.00)	0.00 (0.00)	0.01 (0.01)	0.02 (0.02)	0.03 (0.03)	0.09 (0.07)
Net Income	$30.75 ($0.10)	$64.81 ($1.66)	$77.02 ($3.05)	$84.80 ($4.45)	$104.6 ($5.51)	$90.03 ($5.30)	$84.25 ($5.18)	$66.87 ($4.21)	$45.58 ($2.94)	$31.48 ($1.56)
Net Operating Cash Flow	$128.6 ($2.38)	$281.02 ($11.19)	$362.3 ($19.8)	$430.7 ($29.0)	$573.8 ($33.7)	$515.56 ($33.24)	$438.95 ($27.71)	$322.56 ($18.44)	$180.8 ($8.27)	$76.07 ($0.79)
Analysts[b]	0.26 (0)	0.38 (0)	0.41 (0)	0.51 (0)	0.51 (0)	0.53 (0)	0.48 (0)	0.42 (0)	0.35 (0)	0.28 (0)
Percent Cash Flow[c]	0.11 (0.00)	0.12 (0.05)	0.13 (0.07)	0.14 (0.10)	0.15 (0.11)	0.14 (0.11)	0.14 (0.09)	0.13 (0.08)	0.12 (0.04)	0.09 (0.00)
N	486,167									

[a]Accruals are measured as net income minus net operating cash flows, scaled by average total assets.
[b]Analysts is the number of analysts following a stock. It is set to zero if there is no data on analysts covering the stock in I/B/E/S. This adjustment results in a median value of zero.
[c]PercentCF is the percentage of analysts covering a stock that give a cash flow forecast.

Table 2 compares the mean values of selected characteristics between compliant firms and firms with weak internal controls. It shows that firms with weak internal controls have a smaller market capitalization, a lower share price, higher idiosyncratic volatility, and higher persistence of accruals as a component of earnings, higher illiquidity, lower analyst coverage and cash flow forecasts. These are consistent with the characteristics possessed by high accrual firms that deter investors from engaging in price correcting arbitrage. Lev and Nissim (2006), Mashruwala et al. (2006), among others, have documented the presence of these characteristics in firms with high accruals. Lev and Nissim (2006) note that investors prefer to trade in firms that are large, have a high share price, and high book-to-market ratios. Firms with weak internal controls also have significantly lower liquidity and higher idiosyncratic volatility. Most importantly, the accruals component of current earnings is four times the cash flow component of firms with weak internal controls compared to compliant firms. This is consistent with Ashbaugh-Skaife et al.'s (2008) and Doyle et al.'s (2007) findings that internal control weakness leads to lower quality accruals. Even still, the magnitude of persistence of accruals is firms with weak internal controls is still startling as it is ten times the magnitude of compliant firms. Thus, firms with weak internal controls that also have extreme accruals are likely to be suffering from inattention since they possess undesirable characteristics. As a result, one can expect that the magnitude of excess return earned by exploiting the accruals anomaly using these firms should be higher.

Table 2: Mean Values of Selected Characteristics for Comparing Compliant Firms to Firms with Weak Internal Controls

Characteristics	Compliant Firms	Firms with Weak Internal Controls[a]	All Firms
Market Capitalization[b]	$4,721.6	$994.4	$4,436.3
Price	$57.02	$13.05	$53.66
Annualized Traded Liquidity[c]	0.0615	0.0472	0.0604
Idiosyncratic Volatility[d]	-4.721	-4.787	-4.726
Net Operating Cash Flow	$356.6	$62.47	333.7
Net Income	$73.78	$3.253	68.22
Sales	$1,122.9	$268.5	1055.5
Relative Persistence of Accruals[e]	0.481	4.815	0.822
Analystcf[f]	1.946	0.999	1.893
PercentCF[g]	0.132	0.105	0.130

[a] Firms with weak internal controls are defined as firms have disclosed weak internal control systems under SOX section 404.

[b] Market capitalization is measured in USD millions.

[c] Annualized traded liquidity is a liquidity factor taken from Pastor-Stambaugh.

[d] Idiosyncratic volatility is the log of the standard deviation of residuals from a times series market model regression of the daily returns of extreme accruals firm i's stock on the Fama-French five-factor model.

[e] Relative persistence of accruals is $\beta_{ACCRUALS}$ / $\beta_{CASHFLOW}$ where $\beta_{ACCRUALS}$ and $\beta_{CASHFLOW}$ are the estimated coefficients in the following yearly cross-sectional regression: $\frac{IB_{i,t+1}}{AVGAT_{i,t+1}} = INT_t + \beta\text{ACCRUALS}_t \times \frac{ACCRUALS_{it}}{AVGAT_{it}} + \beta\text{CASHFLOW}_t \times \frac{CASHFLOW_{it}}{AVGAT_{it}}$ where IB represents annual income before extraordinary items, CF represents annual operating cash flows, ACCRUALS is measured as IB minus CF, AVGAT is average annual total assets, and INT is an intercept.

[f] Analysts is the number of analysts following a stock. It is set to zero if there is no data on analysts covering the stock in I/B/E/S. This adjustment results in a median value of zero.

[g] PercentCF is the percentage of analysts covering a stock that give a cash flow forecast.

4. Results

Table 3 reports the average buy-and-hold return over the 156 months from January 2004 to December 2017. It shows a comparison of the raw and size-adjusted excess returns earned by firms with weak internal controls and firms that are compliant with SOX section 404. As documented in the prior literature, there is a negative relationship between the magnitude of accruals and excess returns. More importantly, Table 3 provides evidence to cement the hypothesis that the accruals anomaly persists at a higher magnitude in firms with weak internal controls. The raw excess returns to the low accruals portfolio for firms with weak internal controls are 2% higher than compliant firms. This effect is present in high accruals firms too as firms that have weak internal controls and fall under the high accruals portfolio, which earns annual negative excess returns of -5.4% compared to the annual negative excess return of -4.3% earned by compliant firms. A hedge strategy based on taking a long position in low accruals firms and an equivalent short position in high accruals firms generates raw excess returns of 10.2% for firms with weak internal controls compared to 6.9% for compliant firms. The magnitude of hedge raw excess returns present in firms with weak internal controls is in the same range as the original hedge raw excess returns documented by Sloan. A similar pattern is present in size-adjusted excess return. Moreover, all the excess returns shown in Table 3 are statistically significant and their standard errors are heteroskedasticity robust.

Table 3: Times Series Means of Equally Weighted Portfolio Excess Stock Returns[a]

Portfolios Constructed on Accrual Ranking[a]	Firms with weak Internal Controls[b]		Compliant Firms	
	Raw Excess Returns[c]	Size Adjusted Excess Returns[d]	Raw Excess Returns	Size Adjusted Excess Returns
Lowest	0.048***	0.067***	0.028***	0.039***
	(21.2)	(31.8)	(14.7)	(12.6)
2	0.041***	0.054***	0.014***	0.018***
	(6.6)	(7.1)	(6.8)	(5.8)
3	0.021***	0.010***	0.010***	0.015***
	(3.5)	(5.4)	(13.9)	(4.7)
4	0.016***	0.013***	-0.007***	0.010***
	(8.0)	(6.1)	(-8.9)	(3.5)
5	-0.019***	0.008***	-0.011***	0.005***
	(-8.6)	(4.0)	(-16.6)	(7.4)
6	-0.032***	-0.019***	-0.012***	-0.002***
	(-9.6)	(-13.0)	(-18.0)	(-5.3)
7	-0.035***	-0.024***	-0.014***	-0.003***
	(-12.1)	(-5.2)	(-19.7)	(-8.9)
8	-0.025***	-0.017***	-0.018***	-0.011***
	(-8.6)	(-4.9)	(-25.1)	(-16.6)
9	-0.050***	-0.044***	-0.024***	-0.017***
	(-14.8)	(-3.2)	(-30.7)	(-18.0)
Highest	-0.054***	-0.052***	-0.041***	-0.034***
	(-21.6)	(19.4)	(-40.5)	(-4.9)
Hedge[e]	0.102***	0.119***	0.069***	0.073***
	(18.71)	(42.91)	(24.71)	(13.2)

Portfolios are formed at the start of every month *t* by sorting firms into deciles based on the magnitude of accruals in month *t-1*. The portfolio is held for a period of 12 months post construction and is rebalanced every month.The values in parentheses are t-statistics based on the time-series of the monthly portfolio excess returns. The *t*-statistics are calculated using heteroscedasticity robust standard errors.

[a] Accruals is defined as net income minus net cash flow from operations, scaled by average total assets.

[b] Firms with weak internal controls are defined as firms have disclosed weak internal control systems under SOX section 404.

[c] The raw excess returns is the estimated value of α from the Jensen's alpha regression, which measures the excess return of the portfolio by regressing the return on the equal-weighted market index minus the risk-free rate on the return on the portfolio minus the risk-free rate.

[d] The size-adjusted return is calculated by subtracting the buy-and-hold return of a size-matched value-weighted portfolio of firms from the return of the portfolio.

[e] The Hedge portfolio comprises of a long position in the lowest accrual portfolio and a short position

[*] denotes significance at the 10% level using a two-tailed test

[**] denotes significance at the 5% level using a two-tailed test

[***] denotes significance at the 1% level using a two-tailed test

This paper replicates the regressions on the risk-adjusted returns to the accruals anomaly on the independent variables constructed by Green et al. (2011) for their applied approach. Risk-adjusted return is measured as the raw return minus the return on a size-matched decile. Since this paper is focused on examining whether or not the accruals anomaly persists at a higher magnitude in firms with weak internal controls, a dummy variable, ICweak, which is equal to 1 if the firm has weak internal controls and 0 otherwise, is added to the regression. ICweak has a positive coefficient and is significant at the 1% level indicating that the magnitude of excess returns to the accruals anomaly is indeed higher in firms with weak internal controls. Additionally, AGG_TRADING is replaced with the Annualized Trading Liquidity factor, which is one of the Pastor-Stambaugh liquidity factors. Pastor and Stambaugh (2003) find that aggregate liquidity can explain a portion of the excess return earned by anomaly strategies. This is a parsimonious replacement as AGG_TRADING is insignificant in both Green et al. (2011) and this paper's regressions whereas the Annualized Trading Liquidity factor, which serves as a proxy for liquidity, is statistically significant at the 1% level. It is worth noting that the addition of the liquidity factor significantly improves the model. Green et al.'s (2011) could only explain 9% of the variation in risk-adjusted returns whereas this paper's model can explain 54% of the variation in risk-adjusted returns. This paper documents 2.8% of annual excess returns that cannot be by its model. Interestingly, the coefficient on TIME is positive even though most studies including McLean and Pontiff (2016) suggest that the excess returns earned by an anomaly strategy should decay post-publication with the passage of time. Green et al. (2011) calculate an additional independent variable, namely, AGG_AUM, which is the aggregate assets managed by all hedge funds in year t. This paper was not able to construct AGG_AUM as access to Lipper TASS hedge fund database was not available. It is recommended that AGG_AUM is

used in any further studies on the accruals anomaly as it was significant at the 1% level in the regression run by Green et al. (2011). The modified regression equation is below:

$$R_{it} = \alpha + ICweak_{it} + TIME_t + IVOL_{it} + ACC\_DIFF_{it} + Price_{it} + Annualized\ Traded\ Liquidity_{it} + ACC\_RELPERSIST_{it} + \varepsilon_{it} \quad (4)$$

Table 4: Correlation Among Independent Regression Variables

	Time	IVOL	ACC_ DIFF	ACC_ RELPERSIST	Price	Annualized Traded Liquidity Factor	ICweak
Time							
AGG_IVOL	-0.3341						
ACC_DIFF	0.2469	-0.2325					
ACC_ RELPERSIST	-0.0505	0.0010	-0.0425				
Price	0.4025	0.3359	-0.0670	0.0256			
Annualized Traded Liquidity Factor	-0.5367	0.3680	-0.0511	0.0283	0.1146		
ICweak	-0.3515	0.0467	-0.3954	0.0665	0.1303	0.3152	

Table 5: Results of Estimating Regression of Risk-Adjusted Hedge Returns to Accruals Anomaly on Independent Variables

	(1)	(2)	(3)	(5)	(6)	(7)	(8)
Time	-0.04**						0.071***
	(-2.8)						(3.39)
AGG_IVOL		3341.03***					192.34
		(10.8)					(0.8)
ACC_DIFF			1.79***				3.52***
			(4.9)				(10.9)
Price				0.67***			0.65***
				(16.5)			(18.8)
Annualized Traded Liquidity Factor					1.44***		1.31***
					(27.1)		(25.3)
ICweak						1.28***	0.28***
						(5.1)	(3.4)
ACC RELPERSIST							-0.00
							(-0.9)
Constant	-0.00	0.12***	-0.36***	-1.83***	-0.08***	-0.13***	-2.48***
	(-0.1)	(9.1)	(-5.5)	(-16.5)	(-11.5)	(-6.0)	(-22.3)
N	1727	1727	1727	1727	1716	1727	1592
adj. R^2	0.002	0.096	0.009	0.22	0.30	0.03	0.54

4.1 How Robust is the Accruals Anomaly in Firms with Weak Internal Controls?

The purpose of this section is to test the robustness of the accruals anomaly in firms with weak internal controls. This paper uses the Fama-MacBeth cross-sectional regressions of returns on Accruals conditional on the value for ICweak. It is two-step procedure to examine whether or not the accruals anomaly survives after testing against the three-factor models, namely, the Fama-French (2015) five-factor model, the Stambaugh-Yuan (2017) four-factor model and the Hou et al. (2015) q-factor model. The standard errors of the cross-sectional regressions are estimated using the Newey-West methodology. The Newey-West standard errors are used to overcome autocorrelation across time periods and heteroskedasticity in the error terms. This papers follows a heuristic shortcut used by practitioners and calculates the optimal lag for the

Newey-West using $T^{1/4}$where T is the time period. This method yields an optimal lag of 3 for the Newey-West standard error estimation. It should be noted that the Fama-MacBeth cross-sectional regressions may not be the best method to test excess returns for a value weighted portfolio for the following reasons: Firstly, Hou et al. (2017) underscore that regressions impose a linear functional form and so, the cross-sectional regressions might in fact assign even more weights on microcaps than on equal weights.[24] Secondly, as documented by Fama and French (2015) microcaps make up 60% of the total stocks even though they make up only 3% of the total market capitalization. So, microcaps will probably dominate the Fama-MacBeth cross-sectional regression as it is performed with ordinary least squares. This paper would like to pursue the suggestion of using nonparametric portfolio sorts recommended by Hou et al. (2017). Additionally, this paper suggests employing robustness checks like the Gibbons, Ross, and Shanken (GRS) test and multiple testing corrections like the Bonferroni correction in further research on this topic. The following factor models are used in an attempt to explain the magnitude of excess returns in firms with weak internal controls:

Fama-French (2015) five-factor model: $R_{it} - R_{Ft} = \alpha_i + \beta_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + \varepsilon_{it}$

Stambaugh-Yuan (2017) four-factor model: $R_{it} = \alpha + \beta_{MKT} MKT_{it} + \beta_{SMB} SMB_{it} + \beta_{PERF} PERF_{it} + \varepsilon_{it}$

Hou et al. (2017) q-factor model: $R_{it} = \alpha + \beta_{MKT} MKT_{it} + \beta_{ROE} ROE_{It} + \beta_{IA} IA_{it} + \beta_{ME} ME_{it} + \varepsilon_{it}$

[24] A linear functional form between average returns and anomaly variables is susceptible to influence by outliers. Since these outlier values are more likely to be present in microcaps, which are heavily outnumber non-microcaps, they are likely to exert a higher influence on the Fama-MacBeth cross-sectional regression.

The factors of each of the respective models are interacted with a dummy variable, LowDecile, which is equal to 1 if the firms belong to the low accruals portfolio and 0 otherwise. The hedge returns are estimated by running Fama-MacBeth regressions using the extreme decile firms with the LowDecile dummy and the interaction terms.

Table 6 reiterates the fact that the magnitude of excess returns to the accruals anomaly is higher for firms with weak internal controls. While none of the three-factor models can fully explain the excess returns for either group of firms, the magnitude of the excess returns is higher amongst firms with weak internal controls. Fama-French (2015) note that accruals pose a unique problem when the firms are sorted on accruals, the portfolios in the smallest Size quintile, which are microcaps, have negative RMW slopes. However, the predicted low average returns are not realized. This causes the Fama-French five-model to fare worse than the Fama-French three-factor model when it is used to explain the excess returns generated by the accruals strategy. Hou et al.'s (2015) q-factor model faces a similar problem as the RoE factor loading is large and significant. The predicted negative returns are not realized and this leads to a decrease in the explanatory power of the q-factor model when it is used to test the accruals anomaly. Stambaugh and Yuan's (2017) four-factor model explains the highest proportion of the excess returns among the three models. Yet, even the Stambaugh and Yuan (2017) four-factor model cannot explain an excess return of 7.7% for firms with weak internal controls.

Table 6: Accruals Alphas Under Different Factor Models

	Firms with weak Internal Controls			Compliant Firms		
	FF 5[a]	M4[b]	*q-4*[c]	FF 5[a]	M4[b]	*q-4*[c]
α_{it}	0.107***	0.077**	0.112***	0.071***	0.048**	0.065***
t_{it}	3.83	2.06	4.51	4.94	2.39	3.77

[a] FF 5 represents the Fama-French (2015) five-factor model
[b] M4 represents the Stambaugh-Yuan (2017) four-factor model
[c] q-4 represents the Hou et al. (2015) four-factor model
* denotes significance at the 10% level using a two-tailed test
** denotes significance at the 5% level using a two-tailed test
*** denotes significance at the 1% level using a two-tailed test

5. Conclusion

The accruals anomaly—the negative relationship between accounting accruals and subsequent stock returns—has been well known to academics and practitioners for over two decades. One would expect the accruals anomaly to dissipate and ultimately disappear as investors take advantage of the now-public information. Yet it appears to be the case that investors do not price in the differential persistence of cash flows and accruals immediately. As a result, the debate over the magnitude of current and future excess returns to the accrual anomaly still remains controversial.

This paper finds that the magnitude of excess returns from the accruals anomaly is higher among firms with weak internal controls. While this paper documents the existence of these high returns, it intends to serve as a preliminary investigation. This paper does not account for factors like transaction costs and institutional constraints while estimating excess returns. It should be noted that the higher magnitude of excess returns survives the Fama-French five-factor (2015), the Stambaugh-Yuan four-factor (2017) and the Hou et al. (2015) q-factor models. This higher

magnitude could persist because of the following reasons: either investors don't pay attention to the information contained in accruals, or they are not sophisticated enough to unpack the information contained in accruals, or they shun extreme accruals firms as they possess undesirable characteristics. This paper cannot unambiguously attribute the persistence of the anomaly to either of these reasons. Firms with weak internal controls that have extreme accruals possess characteristics like relatively small market capitalization, low price per share, low liquidity and low book-to-market ratio that are undesirable to most investors. This means that the higher magnitude in firms with weak internal control could be more apparent than real due to the characteristics of these firms that discourage investors from engaging in price-correcting arbitrage. Thus, the mere existence of the higher magnitude of excess returns does not necessarily imply that it can be exploited.

Even if the accruals anomaly does exist at a higher magnitude in firms with weak internal controls, it is primarily a small cap anomaly. It does not challenge the fact that the market as a whole represented by a value-weighted index is efficient. Even though the accruals anomaly seems like an easy-to-implement strategy on the surface, most investors cannot exploit the accruals anomaly in firms with weak internal controls due to the onerous costs and constraints associated with the implementation of the strategy.

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