The Accrual Anomaly

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1. Introduction

The accrual anomaly is unique among asset pricing anomalies in several respects. First, at the time of its discovery, it was the most robust anomaly ever discovered. Second, the anomalous asset pricing behavior associated with accruals has gradually declined in the years since its original discovery. Third, the accrual anomaly is not really an anomaly at all. In fact, the original research documenting the accrual anomaly predicted that it would be there. The term 'anomaly' is usually reserved for behavior that deviates from existing theories. But when Sloan (1996) first documented the accrual anomaly, he was testing a well-known theory and found that it was supported.

Sloan (1996) set out to test the theory that investors fixate too heavily on corporate earnings in establishing stock prices. This theory can be traced back at least as far as Graham and Dodd (1934, pp. 350-352) and has been widely espoused ever since. What changed in the meantime was that some prominent finance academics developed their own new theory, which they called the 'efficient market hypothesis', and soon declared any evidence inconsistent with their theory to be anomalous. Meanwhile, their academic accounting brethren concluded that if stock prices were closely linked to accounting earnings, it must be because earnings did a great job of summarizing intrinsic value. For a while, everyone was happy with this state of affairs. Finance academics could take comfort in the great efficiency of capital markets, and accounting academics could take comfort in the usefulness of accounting earnings in enhancing capital market efficiency.

So what have accruals got to do with all of this? And what are accruals anyway? In a nutshell, accruals are the piece of earnings that is 'made up' by accountants. The other piece of earnings consists of the actual cash flows that a company has generated from its operations. Of course, accountants have rules that guide the measurement of accruals, and auditors are meant to make sure that these rules are followed. But at the end of the day, which piece of earnings do you trust more - the cash piece or the accrual piece? If you chose the cash piece, you are in good company, because that is what Graham and Dodd (1934) chose. In fact, the first part of Sloan (1996) demonstrates that you should trust the cash piece more. The study then investigates whether investors have figured this out. The answer is a resounding no. As previously postulated by Graham and Dodd, investors just seemed to fixate on earnings.

In this review, we will walk you through Sloan's original 1996 research paper and related subsequent developments. We start off by providing a couple of examples to illustrate the nature of accruals and the intuition behind Sloan's tests. We then summarize

Sloan's original research. This is followed by a summary of subsequent research that corroborates and extends Sloan's original research. We next summarize research that challenges Sloan's results and explanations. In reading this particular section, you should remember who we are (Sloan and colleagues). Finally, we discuss some practical aspects of the accrual anomaly, including implementation issues and potential refinements.

2. What Are Accruals?

2.1 A Simple Example

In order to illustrate exactly what accruals are and how they affect earnings, we begin with a simple example. Let us assume that Peter and Paul are two budding entrepreneurs who each decide to set up lemonade stands.

Peter starts his first day of business by buying $100 of lemonade, $10 of cups and renting a lemonade stand for $10/day. This costs him a total of $120, all of which he pays for in cash. By the end of the day, he has sold all of his lemonade and used all his cups. All of his customers pay him in cash and his total cash proceeds are $200. **Exhibit 1** summarizes the financial statements that Peter produces at the end of this first day. His first day's earnings are pretty simple to compute. He ends the day with net income of $200-$120=$80. Peter's balance sheet is also very simple. Peter started his business by contributing $120 in cash (the other side of the balance sheet records his equity ownership stake). He finished the first day with $200 in cash, and so his earnings were $80, his operating cash flows were $80 and his equity ownership stake increased by $80.

Paul, on the other hand, starts his first day by buying $1,000 of lemonade, $100 of cups and a fancy new lemonade stand for $1,000. This costs him a total of $2,100, all of which he pays for in cash. By the end of the first day, he has sold about 10% of his lemonade and has used up about 10% of his cups. Paul also sold his lemonade for a total of $200, but half of his customers were short on cash and so he agreed that they could stop by and pay him the next day, collecting only $100 in cash on his first day. His lemonade stand is now a bit sticky, but it is holding up well and he hopes to get a further 99 days of usage out of it.

Unlike Peter, Paul needs an accountant to help him determine his earnings. One thing he knows for sure is that he is now out of pocket $2,000 in cash, since he had to invest $2,100 to start the business and only collected $100 of cash on the first day. But he still has heaps of lemonade and cups and a nearly-new lemonade stand. Paul's accountant tells him that since he sold about 10% of his lemonade and used about 10% of his cups, the remaining lemonade is worth about $900 and the remaining cups are worth about $90, so Paul has $990 worth of 'inventory'. Paul explains to his accountant that he is still owed $100 for the day's lemonade sales and that he expects to collect the cash tomorrow. The accountant says 'are you sure these customers will come back and pay you?' Paul says 'are you calling me a liar?' at which point the accountant promptly tells Paul that he also has $100 worth of 'accounts receivable'. The accountant also notices the sticky lemonade stand and says 'is this yours?' Paul says 'yes, and I expect to get another 99 days use out of that beauty', upon which the accountant tells Paul that he has 'property, plant & equipment' worth $990.

After hitting a few buttons on his calculator, the accountant tells Paul he now has a balance sheet with $2,080 worth of non-cash assets ($990 of inventory plus $100 of

accounts receivable plus $990 of fixed assets). When Paul started the day, he had no non-cash assets. The increase in non-cash assets for the period is therefore $2,080. This increase in non-cash assets represents the **accruals** for the period. The accountant tells Paul that a quick way to figure out his earnings for the period is to add the accruals to the net cash flows for the period. Cash is -$2,000 and accruals are $2,080, and so his first day's net income is also $80.

[Exhibit 1 here]

Exhibit 1 provides the financial statements for the two businesses. As you can see, Peter and Paul both generated earnings of $80. Moreover, they are both in the same line of business. But their first day's operations were far from the same. Peter's income of $80 is all made of a net cash inflow. Paul's income, in contrast, is made up of $2,080 worth of accruals less $2,000 worth of net cash outflows. Intuitively, while Paul had a net cash outflow of $2,000, the accrual accounting process tells us that his business also generated $2,080 of anticipated future benefits. These anticipated future benefits are recorded as assets on the balance sheet. Their existence and valuation is determined by applying generally accepted accounting principles (GAAP) to information about the business that Paul has provided to his accountant.

In the context of this example, both Graham and Dodd (1934) and Sloan (1996) argued that Paul's earnings are more uncertain, because they depend on accounting estimates of future benefits. For example, what if Paul's customers don't come back and pay him tomorrow? Or what if some of his lemonade inventory goes missing? In either case, $80 will have turned out to be too high an estimate of the earnings that was ultimately generated on the first day. Of course, it is also possible that Paul could end up making more than $80. A grateful customer could come back and pay Paul more than is owed, or Paul could discover he had more lemonade than he thought. This latter scenario would make for a nice dream, but it is unfortunately not a very good description of reality. In most cases of businesses with soaring inventory and receivables, these assets turn out to be worth less than their initial carrying value. We will examine one such case in the next subsection. For this reason, we often say that earnings like Paul's are of lower quality than earnings like Peter's. Peter's earnings have been realized in cash, while Paul's earnings consist primarily of accruals, which anticipate the realization of estimated future benefits. When we see a business in which most of the earnings come from accruals, it is more likely that some of the anticipated benefits will not be realized and so earnings will turn out to have been overstated.

Graham and Dodd (1934) supported their arguments with some illustrative cases. Sloan (1996) was able to take advantage of computerized databases to provide more systematic support using a large sample of thousands of stocks trading on a major US exchange since the 1950s. We will discuss exactly how he did this in the next section.

2.2 A Case Study

We are now in a position to describe how to measure accruals for any company using computerized financial data, such as that supplied by Compustat. Sloan's original measure of accruals focuses on changes in current asset and current liability accounts on the balance sheet. We will illustrate the computation of accruals using KB Home as a case study. KB Home is one of the largest homebuilders in the US, with a big presence in states such as Florida, California and Arizona. KB Home expanded aggressively during the booming

housing market of 2002-2006 and has since hit upon hard times. It is a classic example of how the examination of accruals can assist in the evaluation of the quality of a company's earnings. The pertinent data for KB Home are provided in **Exhibit 2**. Note that we have only extracted the current asset and current liability data that are required to compute Sloan's original measure of accruals.

The first step in the calculation of Sloan's measure of accruals is the computation of current net operating assets. Current net operating assets is defined as current operating assets less current operating liabilities. **Exhibit 2** shows that Compustat reports current assets in four categories (Cash, Accounts Receivable, Inventories and Other Current Assets). Of these, we exclude Cash, since cash is a financial as opposed to an operating asset. Current liabilities are also reported in 4 categories (ST Debt, Accounts Payable, Income Tax Payable and Other Current Liabilities). Of these, we exclude ST Debt, because this is a form of financing rather than an obligation arising from the firm's operations. [1] Sloan also excluded Taxes Payable for similar reasons. We could argue whether Taxes Payable is a form of financing or an operating obligation, but as a practical matter it is usually pretty small and makes little difference. Thus, we compute current net operating assets as follows:

Current Net Operating Assets:
= (Current Assets-Cash) - (Current Liabilities – ST Debt – Income Taxes Payable)

Exhibit 2 computes KB Home's current net operating assets from 2002 through 2009. You can see that they gradually rise from 2,167.8 in 2002 to a high of 4,426.7 in 2005 and subsequently plummet to 944.8 in 2009. You can also see that the biggest determinant of operating assets is inventories, which largely consists of partially finished houses and finished houses that have yet to be sold. By now, you can probably see a similarity between Paul's lemonade business and KB Home's homebuilding business. In both cases, they often sell only a small proportion of their total inventory in any given period. Consequently, their earnings depend critically on how they value their remaining inventory. Moreover, monetization of earnings hinges on their ability to sell the remaining inventory for more than it is valued on the balance sheet.

Returning to the computation of accruals, the computed amounts of net operating assets represent end of period balances of accountants' estimates of expected future benefits. To compute the accrual component of periodic earnings, we need to take the change in these balances over the period in question. Like Sloan, we focus on annual earnings, and so we compute accruals by taking the change in net operating assets over the year:

Accruals = Current Net Operating Assets (End of This Year) – Current Net Operating Assets (End of Previous Year)

[1] Cash includes cash and other short-term investments and ST Debt includes short-term debt and the current portion of long-term debt. Another term you will see used for "current net operating assets" is "non-cash working capital" (this is the term Sloan used in his original paper). We use these two terms interchangeably but you should be careful to always check how accruals are defined, since definitions vary considerably (as we will discuss later in the review).

You can see the accrual computations for KB Homes in **Exhibit 2**. Accruals grow from 197.0 in 2003 to 1,225.8 in 2005 and then turn negative for 2006 to 2009. Let's try and understand why accruals are so big and positive in 2005. Scanning through the current asset accounts, you should quickly notice that 2005 was characterized by a dramatic increase in inventory, from 4,143.4 at the end of 2004 to 6,128.3 at the end of 2005. In other words, while KB Home probably sold a lot of homes in 2005, it also constructed over $2 billion worth more homes than it sold. Moreover, it had also been building more homes than it sold in previous years, such that it had a total unsold home inventory in excess of $6 billion at the end of 2005.

[Exhibit 2 here]

Next, let's look at KB Home's reported net income. Net income gradually increased from 314.4 in 2002 to 842.4 in 2005, leveled off to 482.4 in 2006, plummeted to -1,414.8 in 2007 and has been negative ever since. **Figure 1a** plots the patterns in accruals and net income. You can see that they are similar. Both grew from 2002 to 2005 and then dramatically reversed course. **Figure 1b** plots the cash flow component of earnings, which tends to move in the opposite direction to accruals. KB Home's high accruals and low cash flows in 2005 alert us to the potentially low quality of its earnings.

Let's take a closer look at KB Home's 2005 net income. In that year, reported income was 842.4, but accruals were 1,225.8. This means that the implied cash component of earnings was -383.4. So while KB Home reported record net income, its cash component of earnings was negative. That is, the record net income was attributable to accounting accruals. But how do we know the anticipated future benefits associated with these accruals are going to be realized? And shouldn't we be somewhat alarmed that KB Home now has to unload over $6 billion in unsold homes before this net income is fully realized in cash? This was Sloan's key argument. If net income is high only because accruals are high, then perhaps it is less likely that this net income will ultimately be realized in the form of cash. In particular, if some of the benefits that are anticipated by the accruals are not subsequently realized in the form of cash, the associated accruals will have to be reversed and charged off against future earnings. This is exactly what happened to KB Homes. In 2007, it wrote off around $1 billion worth of inventory, which is the main reason why its accruals and net income were so negative in that year.

At this point, you may be thinking to yourself 'but isn't this an unusual case, because 2007 happened to be when the US housing market bust?' If so, you are both right and wrong. You are right in that high accruals are **not always** followed by accrual reversals and lower net income. But you are wrong in that Sloan found that this pattern was observed **on average**. So while KB Home represents an extreme example, this is the basic pattern that Sloan documented for the typical high accrual firm. We will cover Sloan's results in the next section.

Let's finish this section by taking a look to see whether the stock market seemed to figure things out in the case of KB Home. **Figure 1c** plots KB Home's stock price using a suitable scale on the right hand side of the graph to make it easily comparable to the corresponding accrual data that is also plotted on the graph. You can see that the stock price rose from $22.35 at the end of 2002 to $69.77 at the end of 2005. Thereafter it began a gradual decline, dropping to $11.63 by the end of 2008. By now, you should have noticed that the pattern in the stock price is amazingly similar to the pattern in accruals and net

income. **Figure 1d** plots stock prices along with cash flows. What you can see here is that stock prices are moving in the opposite direction to cash flows. Despite the fact that 2005 net income was all due to accruals, investors assigned the company a record valuation at the end of that year. There is no indication that investors discounted the 2005 net income because of the lower quality of the earnings. In the next section, we will see that Sloan found similar results across his large sample of firms.

[Figure 1 here]

3. Sloan (1996) in a Nutshell

We are now in a good position to summarize Sloan's original paper. We have already explained why Sloan hypothesized that the accrual component of earnings would be of lower quality than the cash flow component of earnings. We begin this section by summarizing Sloan's basic tests and results. While Sloan's paper contains some reasonably complex equations and estimation techniques, the basic tests and results can be readily explained. For the interested reader, we summarize the equations and related estimation techniques in **Appendix A**.

3.1 Basic Tests and Results

In order to systematically analyze earnings quality across a large set of firms, Sloan first had to 'standardize' all of the measures to facilitate the comparison of firms with vastly different sizes. Sloan accomplished this by scaling earnings, accruals and cash flows by total assets. Remember that accruals are essentially changes in assets. So Sloan figured that if changes in assets were large relative to the level of assets, accruals must be making a large contribution to earnings.[2] Moving forward, each time we refer to earnings, accruals or cash flows, we will be referring to the scaled version.

Next, Sloan wanted to see whether earnings driven by accruals were of lower quality than earnings driven by cash flows. To do this, Sloan looked to see whether high (low) earnings were less likely to remain high (low) if the earnings were driven by accruals. We conduct an updated version of Sloan's analysis, which can be summarized as follows:

(i) Compute earnings, accruals and cash flows for a sample of firm-years from the COMPUSTAT database between 1970 and 2007;
(ii) Within each fiscal year, rank observations from lowest to highest based on earnings;
(iii) Assign firm-years into deciles based on the rank of earnings, with decile 1 consisting of the lowest-ranked 10% and decile 10 consisting of the highest-ranked 10%;
(iv) Compute the average level of earnings for firm-years in each decile;
(v) Track the average level of earnings for the corresponding set of firm-years in the surrounding 10 years (5 years either side of the ranking year).
(vi) Construct a plot of average earnings over the 11 years for the highest and lowest deciles.

This is what academics refer to as an 'event-time plot'. It enables us to understand the persistence of extreme earnings performance.

[2] Hafzalla, Lundholm and Van Winkle (2011) argue that directly scaling by earnings produces better results.

[Figure 2 here]

Panel A of Figure 2 reports the resulting plot. Two things are worth noting. First, the spread in earnings between the highest and lowest deciles is greatest in year 0. This is because we selected the firms based on earnings performance in this year. Second, earnings performance for the two extreme deciles tends to slowly drift back together over the surrounding years. But note that the two lines are still quite far from converging even after 5 years. This plot tells us that earnings performance is highly persistent. If a firm has high earnings performance this year, it is expected to continue to have high earnings performance for several years into the future.

The next thing that Sloan did was to perform the same set of steps, but with just one change. In step (ii), he ranked the observations based on the magnitude of the accrual component of earnings. **Figure 2B** provides our replication of his results. There are two things of note. First, the spread in earnings is again greatest in year 0. This is because we have ranked on accruals in year 0, and accruals are a component of earnings. Second and more importantly, the rate at which the earnings converge in the surrounding years is much faster than in the previous plot. In fact, the convergence is pretty much complete after 5 years. In other words, earnings performance that is driven by high accruals is not very persistent.

To drive this point home, Sloan next performed the same set of steps, but ranked on the cash flow component of earnings in step (ii). **Figure 2C** provides our replication of these results. It is very clear that earnings converge much more slowly in this plot. So earnings that are attributable to cash flows are very persistent, while earnings that are attributable to accruals are much less persistent.

To summarize, **Figure 2** demonstrates that if we see a company with high earnings today, we can expect that it will also have reasonably high earnings in the future. But if we really want to assess the likelihood of it staying high, we should also check whether the current high earnings are driven by accruals or cash flows. If it is driven by accruals, it is much less likely to stay high, while if it is driven by cash flows, it is much more likely to stay high. The earnings of Paul's business and KB Home in 2005 are both examples of cases where high earnings were driven by high accruals. This is a warning sign that the earnings are likely to fall in the future.

The other main question that Sloan's study addresses is whether investors use information in accruals and cash flows to forecast the persistence of earnings. In other words, do stock prices act like investors already know that firms with high accruals are likely to experience relatively large drops in future earnings? The way that Sloan did this was to look at the subsequent stock returns earned by portfolios of firms with extreme earnings, accruals and cash flows respectively. Previous research had already shown that stock prices were strongly positively related to earnings. If investors understood that firms with high accruals were likely to have lower future earnings, then we shouldn't expect to see abnormal future returns for a portfolio of high accrual firms. But if investors failed to heed the warnings offered by the high accruals, we would expect to see unusually low future returns to a portfolio of high accrual firms. We conduct an updated version of Sloan's tests as follows:

(i) Compute accruals for a sample of firm-years on the COMPUSTAT database between 1970 and 2007.
(ii) Within each fiscal year, rank observations from lowest to highest based on accruals;
(iii) Assign firm-years into deciles based on the rank of accruals, with decile 1 consisting of the lowest-ranked 10% and decile 10 consisting of the highest-ranked 10%;
(iv) Compute the subsequent annual stock returns for firm-year observation beginning 4 months after the fiscal year end (the 4 month rule allows for financial statement information for the fiscal year to be made available to investors);
(v) Compute the subsequent annual equal-weighted portfolio returns for each accrual decile.

[Table 1 here]

Table 1 Panel A provides the results. The table reports the annual returns for each accrual portfolio over the 3 years subsequent to their being assigned to that accrual portfolio. Visual inspection of the returns indicates that the highest accrual portfolio has the lowest future return in year t+1 and t+2. These returns are exactly what would be expected if investors did not anticipate the greater likelihood of future earnings declines for high accrual firms. We note in passing that the strength of these results is somewhat weaker than those originally reported by Sloan. As we will discuss in more detail later, this is because investors appear to have learned about the quality of the accrual component since Sloan's study. At the very bottom of **Table 1 Panel A**, we report the 'hedge' returns to an investment strategy of going long in the lowest accrual portfolio and short in the highest accrual portfolio (i.e., buying the stocks where earnings is expected to go up and short-selling the stocks where earnings is expected to go down). The hedge return is 11% over the subsequent year.

We have focused on accruals so far. But note that we could apply the same logic to cash flows with the opposite prediction. If investors don't discriminate between the accrual and cash flow components of earnings, then they won't realize that a firm with low cash flows will have more persistently low cash flows in the future. As such, we would expect there to be lower subsequent returns to a portfolio of firms formed on low cash flows. **Table 1 Panel B** provides the results of replicating the stock return analysis for portfolios formed on cash flows instead of accruals. Cash flows are calculated as the difference between earnings and accruals. The results indicate that investors do not fully anticipate the higher persistence of the cash component of earnings. For example, the lowest cash flow portfolio has the lowest subsequent returns in year t+1. The hedge returns are smaller for the cash flow strategy (2.8%). Why the difference? Accruals and cash flows are not perfectly negatively correlated so the two hedge portfolios are selecting different firms. In fact, the overlap of firms selected in the hedge portfolios is only around 60 percent.

The returns reported in Table 1 are the average returns from 1970 to 2007. What if the results are all driven by one or two spectacular years? How risky is the strategy? **Figure 3** addresses these questions by providing the hedge returns to the accrual strategy by year. The results indicate that the annual hedge returns are positive in all but one of the years prior to 1996 (the year Sloan's study was published). It has been a very low risk strategy. In fact, a recent paper by Hirshleifer, Hou and Teoh (2011) finds that the risk/return trade-off offered by the accrual strategy dominates all other contenders, including the overall

equity premium and the well known Fama & French size and book-to-market strategies. After 1996 the pattern gradually becomes more mixed. What has happened? A paper by Green, Hand, and Soliman (2010) argues that the accrual anomaly is likely to have been arbitraged away as sophisticated investors attempted to exploit Sloan's results. This is more than just a conjecture, as the accrual anomaly has been a favorite strategy of large quantitative investors.

Figure 4 provides the annual hedge returns to the cash flow strategy. The returns to this strategy appear to be somewhat more volatile than the accrual strategy, generating very negative returns in 1998 and 2002. However, the hedge returns are still positive in 29 of the 38 years.

We have now summarized Sloan's key ideas, tests and results. The paper itself contains a couple of additional sets of analysis. First, Sloan develops and estimates a set of equations to formally test the ideas outlined above. For the technically minded, we summarize these equations in Appendix A. For the rest of us, there are really just two important insights from that analysis. First, Sloan verified that the key results outlined above were statistically significant. Second, Sloan was able to demonstrate that the magnitude of the predictable stock returns reported in table 1 is consistent with investors fixating on earnings. In other words, he estimates by how much stocks would be mispriced if investors were to fixate on earnings, and then shows that this corresponds nicely with the actual amount mispricing.

He also examined whether the predictable returns documented in **Table 1** were concentrated around subsequent earnings announcements. If the predictable stock returns arise because investors do not anticipate the more rapid mean reversion of the accrual component of earnings, then we would expect investors to learn about this when subsequent earnings are announced. So these tests were another way that Sloan could corroborate the idea that investors were fixated on earnings. Sloan found that around half of the predictable returns were concentrated around subsequent earnings announcements. Interestingly, he found that the predictable returns were nearly all concentrated at earnings announcements for low accrual firms (for which earnings tend to increase), but not for high accrual firms (for which earnings tend to decrease). Sloan attributed the latter result to the fact that firms are more likely to preannounce bad earnings news (see Skinner, 1994).

4. Extensions of Sloan (1996)

Sloan's paper generated a lot of interest among both academics and practitioners and has become one of the most highly cited accounting research papers. The paper struck a raw nerve with academics that still clung to the efficient markets hypothesis. We will examine their reaction in more detail in Section 5. This led Sloan and others to seek ways to corroborate the original findings. Moreover, because of the obvious practical appeal of Sloan's findings, additional research was conducted to try and extend his findings to produce better measures of earnings quality and improved trading strategies. We review this research next.

Our review of this research is organized into five subsections. Section 4.1 summarizes research investigating whether sophisticated financial intermediaries, such as sell-side analysts, institutional investors and auditors, appear to understand information in accruals. Section 4.2 examines research using broader definitions of accruals. You may recall that Sloan's original research only looks at 'working capital' or 'current' accruals. A natural extension is to look at non-current accruals, such as the capitalization of expenditures on PP&E and business acquisitions. Section 4.3 summarizes research that examines situations where Sloan's story indicates that the accrual anomaly should be particularly strong. For example, in subsets of firms where accruals are relatively less persistent than cash flows, we should see a relatively stronger accrual anomaly. Section 4.4 summarizes research using future information and events other than stock returns to corroborate the earnings quality story. For example, are high accrual firms more likely to get sued for manipulating earnings? Are they more likely to have subsequent asset write-downs? Finally, section 4.5 examines the accrual anomaly around the world. Sloan's research uses US data. Is the accrual component of earnings less persistent in other countries? If so, do investors in these other countries also fixate on earnings?

4.1 Do Sophisticated Financial Intermediaries Use Information in Accruals?

Bradshaw, Richardson and Sloan (2001) seek to provide corroborating evidence for the earnings fixation hypothesis by looking at whether sell-side analysts and auditors use information in accruals. With respect to sell-side analysts, they looked at whether the earnings forecasts of these analysts anticipated the lower persistence of the accrual component of earnings. Their results indicate that sell-side analysts appear to be largely oblivious to the lower persistence of accruals. In other words, the analysts fixate on earnings. For example, Bradshaw et al. found that analysts' earnings forecasts for firms with high accruals were initially far too optimistic. Furthermore, even though they revised their forecasts down over time, they were still too optimistic immediately prior to the subsequent earnings announcement date.

Bradshaw et al. also looked to see whether auditors seem to use information in accruals. Auditors are meant to provide an opinion as to whether firms' earnings fairly present the results of their operations. Recall from our earlier analysis that firms with high accruals tend to have overstated their earnings. So a smart auditor could presumably have figured this out and either warned investors through either issuing a qualified audit opinion or resigning. Yet Bradshaw et al. (2001) found no evidence of either a higher incidence of auditor qualifications or a higher incidence of auditor changes in firms with high accruals.

A related question is why didn't institutional investors identify the accrual anomaly and arbitrage it away? Lev and Nissim (2006) find that some active institutional investors do trade on the accrual anomaly but that the magnitude of their trading is relatively small. Lev and Nissim conclude that the majority of institutional investors avoid extreme-accruals firms because they have other attributes that are not desirable, including being illiquid and volatile stocks. Ali, Chen, Yao and Yu (2008) provide evidence that some mutual funds have successfully implemented the accruals strategy in the US market. In addition, consistent with institutional investors being more sophisticated than other investors, Collins, Gong and Hribar (2003) document that stocks with high institutional ownership exhibit prices that more accurately reflect the persistence of accruals.

Finally, since institutional investors dominate corporate bond markets and the role of bond rating agencies is to evaluate the quality of the underlying issuers, it is possible that the accrual anomaly could be weaker in bond markets. Bhojraj and Swaminathan (2008) investigate this issue and find that accrual anomaly is also robust in bond returns. The authors point out that this is somewhat surprising given that one would think that bondholders would look behind the earnings number and focus on cash flows. But bondholders appear to misprice accruals in a similar manner to equity holders.

In summary, the available evidence indicates that sophisticated financial intermediaries do not fully utilize information in accruals about earnings quality. This evidence corroborates Sloan's original hypothesis that the anomaly persists because investors tend to fixate on earnings.

4.2 Using a Broader Definition of Accruals

Sloan's (1996) definition of accruals focused on the change in current net operating assets. Richardson, Sloan, Soliman and Tuna (2005) expand the definition of accruals. They decompose the balance sheet into changes in current net operating assets, changes in noncurrent net operating assets, and changes in net financial assets. They argue that the aggregate change in both current and noncurrent net operating assets provides a more comprehensive measure of accruals. **Appendix B** illustrates their decomposition using Harley Davidson's balance sheets. Richardson et al. use data from 1962 to 2001 and form hedge portfolios (long lowest accrual decile, short highest accrual decile) for various accrual measures. For the change in non-cash net operating assets the hedge returns is 18 percent per year. In contrast, when they use Sloan's original definition that includes only the change in current net operating assets, the hedge return is only 13.3 percent. Why does the broader definition produce stronger returns? The broader definition includes accountants' estimates of long-term future benefits. Recall that in **Exhibit 1**, Paul spent $1000 on a lemonade stand. Sloan's original definition of accruals would exclude this accrual because it only uses current accruals. Likewise, when WorldCom committed their multi-billion dollar fraud, they did so by incorrectly capitalizing cash expenses as 'property, plant and equipment'. These long-term accruals are not incorporated in Sloan's original definition of accruals. Therefore, the broader definition should provide a more complete measure of accruals and a better measure of earnings quality.[3] Richardson et al.'s results support the efficacy of the broader measure of accruals.

A related paper by Hirshleifer, Hou, Teoh and Zhang (2004) suggests that Sloan's accrual metric can also be improved by incorporating accruals from prior years. Recall that Sloan only considers accruals made over the past year. This choice is somewhat arbitrary. Why not look at the last quarter or the last 5 years? Fortunately, Sloan's persistence tests support the use of a year, because the lower persistence of accruals appears to largely manifest itself over the next 1 to 3 years. Hirshleifer et al. argue that aggregating accruals over the entire life of the firm should produce a better measure of earnings quality and

[3] In a similar vein, Cooper et al. (2008) document a negative relation between total asset growth and subsequent abnormal returns. Growth in total assets is highly correlated with the change in net operating assets (remember that this latter measure is deflated by total assets). Moreover, Richardson et al. (2005) demonstrate that measures of accruals incorporating operating liabilities and excluding financial assets (which are the two main differences between total assets and net operating assets) results in a measure of accruals that better reflects earnings quality.

claim to provide supporting evidence. Richardson, Sloan and Tuna (2006) cast doubt on the interpretation of the evidence in Hirshleifer et al. (2004). They note that Hirshleifer et al. essentially divide aggregate accruals in the current year by aggregate accruals in the previous year and that this is equivalent to measuring accruals over one year (because accruals from earlier periods are in the numerator and denominator and so will cancel out). Nevertheless, Richardson et al. consider deflating by accruals from even earlier years and find that deflating by accruals from two years earlier provides a slightly better measure of earnings quality. Thus, their evidence suggests that earnings quality is best measured by aggregating accruals over the past two years.[4]

4.3 Where is the Accrual Anomaly Strongest?

Thomas and Zhang (2002) examine the individual balance sheet components of Sloan's accrual measure and attempt to identify which component is primarily responsible for accrual anomaly. They find that inventory accruals exhibit the most robust relation with future stock returns. Chan, Chan, Jegadeesh, and Lakonishok (2006) document a similar finding. There is no clear explanation for this result, though it is likely due to both the economic magnitude of inventory accruals and the reluctance of managers to write-down inventory in the face of slowing demand.

Researchers in accounting have also developed models using regression analysis to decompose accruals into a "normal" component that is due to the growth in the economic activities of the firm and a "discretionary" component that is more likely to misstate future benefits. Xie (2001) shows that the discretionary component of accruals is less persistent than the normal component of accruals. He also shows that future predictable returns are stronger for the discretionary component. The key take-away from his paper is that we can get a better measure of earnings quality by eliminating accruals that appear to be economically justified. Chan, Chan, Jegadeesh, and Lakonishok (2006) provide similar evidence. They also investigate whether the accrual strategy works better in industries that have larger working capital accrual requirements. They find the strategy is positive in 29 out of 32 industries and the spread tends to be larger in industries where working capital is a more important component of total assets. The industries where the hedge returns are largest during their sample period are construction 16.2%; toys 10.9%; computers 9.4%; household 9.1%; electrical equipment 8.6%; and rubber 8.6%. The strategy does not work in drugs, mines, or energy.

Finally, Shi and Zhang (2011) investigate some direct implications of Sloan's explanation for the magnitude of the accrual anomaly. They point out that if Sloan's explanation is correct, the accrual anomaly should be strongest for firms where:

(i) The accrual component of earnings is relatively less persistent than the cash flow component; and

(ii) Stock prices have a greater response to earnings surprises.

Shi and Zhang (2011) first show that both of these characteristics appear to vary across firms. They then show that incorporating this variation significantly increases the returns

[4] Based on their evidence, it would seem that the optimal accruals measure would aggregate accruals over more than one year, but place increasingly less weight on accruals from earlier years. Intuitively speaking, we place less weight on earlier years' accruals, because there is a greater possibility that they have already reversed and impacted earnings.

to the accrual trading strategy. For example, the accrual hedge portfolio returns for firms with the lowest relative accrual persistence and highest earnings response coefficients exceed an annualized average return of 60 percent. **Appendix A** provides more details on Shi and Zhang's research design.

4.4 Investigation of Subsequent Events Following Extreme Accruals

Several papers investigate the years following extreme accruals to provide additional insights into why the accrual component of earnings is less persistent than the cash component of earnings. This research also helps to identify the types of future events that drive the returns to the accrual anomaly. As mentioned above, Thomas and Zhang (2002) find that the accrual anomaly is strongest for inventory accruals. The question is why? Allen et al. (2010) address this question by showing that extreme inventory accruals are particularly likely to experience extreme subsequent reversals. In particular, they find that firms with big inventory increases are much more likely to report inventory write-downs in subsequent years. This is exactly what we saw happen to KB Homes in Exhibit 2. Chan, Chan, Jegadeesh, and Lakonishok (2006) perform a similar analysis on high accrual firms and find that a greater proportion of these firms end up reporting negative special items over the next three years.

Richardson, Sloan, Soliman, and Tuna (2006) investigate whether high accrual firms are more likely to have manipulated their earnings. Specifically, they investigate whether high accrual firms are more likely to have subsequent SEC enforcement actions taken against them for overstating earnings. Their results are consistent with this prediction. Dechow, Ge, Larson, and Sloan (2011) provide similar evidence using a more comprehensive sample of SEC enforcement actions. Both of these studies show that firms accused of manipulating earnings have unusually high accruals. The accounts most often alleged to be subject to manipulation are accounts receivable and inventory. In addition, the high accruals for these manipulation firms reverse and become sharply negative in subsequent years.

In related research, Dechow and Ge (2006) focus specifically on low accrual firms and argue that when low accruals are driven by special items (i.e., write-offs and other unusual negative items), the low accruals will be less persistent (earnings will improve more quickly). Their evidence is consistent with this prediction. They find that the positive future returns are much higher for low accrual firms with special items than for other low accrual firms. This is somewhat surprising, since managers have an incentive to highlight the temporary nature of the negative special items to investors. Dechow and Ge (2006) find that low accrual firms with negative special items tend to have performed particularly poorly and have lost popularity with analysts and investors. They conclude that investors overreacted to bad news related to negative special items and are subsequently positively surprised when performance improves.

4.5 The Accrual Anomaly around the World

The accrual anomaly has been examined in other countries besides the US, providing supporting evidence of its robustness. It is not just a freak occurrence in US markets. **Table 2** is extracted from Leippold and Lohre (2010) and summarizes the key results of their study and a related study by Pincus et al. (2007). The accrual anomaly generates positive hedge returns in 22 out of 26 countries (85 percent) in the Leippold and Lohre study. Of

these, 12 are significant at the 10 percent level. For the Pincus et al. study, the accrual hedge return is positive in 17 out of 20 countries (85 percent) and significant in 11 of them. Chan, Chan, Jegadeesh and Lakonishok (2006) also show that the accrual anomaly exists in the UK, which is consistent with the studies reported in **Table 2**.

There are several things to consider when examining international evidence. First, the general take-away from international research is that the accrual anomaly appears stronger in common law countries than in civil law countries. This suggests that it holds more strongly in countries with established capital markets that have similar accounting and legal systems to the US. Second, the number of observations varies considerably across countries with the US and the UK having far more observations than other countries. Therefore, low test power is a possible explanation for the lack of significance in countries with less established markets. Finally, related to our discussion of Shi and Zhang (2011) above, the accrual anomaly is expected to be stronger in countries that have both (i) stronger reactions to earnings news; and (ii) where accruals are relatively less persistent than cash flows. So even if investors in all countries fixate on earnings, we would still expect variation across countries in the returns to the accrual anomaly.

[Table 2 here]

5. Alternative Explanations for the Accrual Anomaly

We start this section by noting that the large body of evidence discussed in the previous section systematically supports Sloan's original explanation. With all this corroborating evidence, you might wonder whether there could conceivably be different explanation that is consistent with the same set of results. But since market efficiency is such an entrenched paradigm, many researchers have sought to provide alternative explanations to try and preserve it. We group these explanations into three categories. The first two categories are consistent with the efficient markets hypothesis. These include risk-based explanations (discussed in section 5.1) and research design issues (discussed in section 5.2). The third category does not necessarily question the anomaly itself, but provides a different interpretation that relates to investor pricing of growth (discussed in section 5.3).

5.1 Risk-Based Explanations

Risk-based explanations are the natural default explanation of efficient market aficionados for any anomaly. The basic idea is that stocks with predictably higher (lower) returns must be more (less) risky. Investors are assumed to have already figured this out and have priced the stocks accordingly. In order to make a compelling case that the accrual anomaly is attributable to risk, one first has to come up with a story as to why investors find low (high) accrual stock more (less) risky. Ideally, one would like to identify the underlying risk factor and show that it subsumes accruals in predicting future returns. The next step is to explain why the evidence from the previous two sections is also consistent with the risk-based explanation. Existing research in this area generally does a poor job on both counts.

The standard CAPM or three factor Fama-French model do not explain the returns to the accrual anomaly. In fact, Sloan (1996) checked to see whether existing risk metrics

subsumed the accrual anomaly, and they did not. So researchers have tried to find new risk factors that could potentially subsume the accrual anomaly. Khan (2008) proposes a four-factor risk model, which is essentially the standard Fama-French three factor model with the excess return on the market portfolio decomposed into discount rate news and cash flow news. He also uses quintiles in place of deciles to construct accrual hedge portfolios. After doing so, he finds that the economic and statistical significance of the accrual anomaly is diminished. Khan then claims that the four-factor model captures rationally priced economic and financial distress characteristics that are correlated with accruals. Khan's research suffers from at least three shortcomings. First, he conducts low power tests. By incorporating additional factors and using quintiles in place of deciles, we would mechanically expect the economic and statistical significance of the accrual anomaly to decline even if Sloan's hypothesis is true. Second, Khan doesn't explicitly identify the characteristics that are supposedly captured by accruals. He doesn't measure them directly, and show that they subsume the accrual anomaly. Finally he doesn't explain the other evidence from the previous section that is also consistent with Sloan's explanation.

Hirshleifer et al. (2011) cast further doubt on the risk explanation in general and Khan's explanation in particular. The authors follow Fama and French (1993) methodology and construct an accrual factor mimicking portfolio, that is a portfolio that goes long in low accruals firms and short in high accruals firm. They label it the Conservative minus Aggressive (CMA) portfolio. The accrual factor is analogous to the Small Minus Big (SMB) and High Minus Low (HML) factors of the three-factor Fama-French model. The basic idea is that if risk explains the accrual anomaly, then firms whose returns comove with the accrual factor should have higher returns. However, their statistical tests fail to confirm such a prediction. In contrast, the authors find that the level of accruals predicts returns irrespective of the covariation of the returns with the CMA factor. Hirshleifer et al. conclude that investors misvalue accruals and cast doubt on the rational risk-based explanation.

5.2 Research Design Issues

The accrual anomaly has been successfully replicated. In fact, documenting the accrual anomaly is an exercise that is often given to accounting Ph.D. students to hone their computing skills. It is in the data. If you don't find it, you did something wrong. But it is still possible that there is some sort of research design error, such as the use of information that wouldn't really have been available to investors in real time. In order to explore this possibility, Livnat and Santicchia (2006) use a unique 'point in time' database containing originally reported, unrestated financial data and they also use actual SEC filing dates to begin investing on this information. Their results corroborate Sloan's original results using standard Compustat data and a four month lag to allow for SEC filings. So hindsight bias doesn't appear to be a problem.

A paper by Kraft, Leone, and Wasley (2006) shows that deleting extreme future stock returns causes the accrual anomaly to disappear. The authors claim that this evidence is inconsistent with Sloan's explanation for the accrual anomaly. But subsequent research by Teoh and Zhang (2009) points out that there is a natural explanation for the results in Kraft et al. (2006) and that Kraft et al. are wrong in claiming that their evidence is inconsistent with Sloan's explanation for the accrual anomaly. To see why, first note that Kraft et al. are not removing data errors, but actual cases where firms had spectacularly high future returns. Since firms with extreme accruals tend to have more volatile returns, removing

spectacular performers causes the average returns to be lower for extreme accrual firms. Of course, an investor would love to have known which firms were going to have spectacular stock returns, but Kraft et al. only identify these firms with the benefit of hindsight. It seems ironic that Kraft et al. could only make the accrual anomaly disappear by using a flawed research design that incorporates significant hindsight bias.

5.3 Growth-Based Explanations

Growth based explanations for the accrual anomaly are the most difficult to refute, because the explanations themselves are poorly defined.[5] There is no doubt that accruals represent a type of growth. Specifically, they represent growth in management's estimates of the future benefits that will accrue to a firm. Sloan (1996) argues that when accruals are unusually high, the expected future benefits are less likely to materialize, causing future earnings to be lower. Fairfield, Whisenant and Yohn (2003) provide an alternative explanation for this finding. They argue that diminishing returns to new investment cause the lower future earnings and stock returns. Under their story, accountants are correctly measuring the future benefits. But increases in the number of units produced and sold lead to lower prices and hence lower future profitability. In the language of an economist, a shift to the right in the supply curve pushes the equilibrium market clearing price down the downward sloping demand curve.

If the Fairfield et al. (2003) explanation were true, one would expect more direct measures of quantity sold to be better at predicting future reductions in earnings and stock returns. For example, growth in sales should have stronger implications for earnings persistence and stock returns. However, evidence in Xie (2001), Chan, Chan, Jegadeesh and Lakonishok (2006) and Richardson, Sloan, Soliman and Tuna (2006) shows that accruals that are unrelated to contemporaneous sales are better at predicting future returns than those accruals that are related to sales. This evidence is inconsistent with the growth explanation and consistent with Sloan's original explanation. In addition, much of the evidence presented in section 4 is difficult to reconcile with the growth explanation. For example, Allen et al. (2010) find that predictable returns are attributable to extreme accrual reversals, which is more consistent with the earnings quality explanation than the diminishing returns to scale explanation. Finally, a recent paper by Chu (2011) finds evidence that is consistent with Sloan's explanation but inconsistent with the growth explanation. Chu identifies a set of firms that operate with negative working capital (current assets are less than current liabilities). For such firms, growth in units sold and net operating accruals tend to move in opposite directions. This is because current liabilities grow more than current assets as the firm grows sales. Thus, Chu identifies a unique setting where the earnings quality and growth explanations have conflicting predictions. Chu's results support the earnings quality explanation. She finds that firms with low operating accruals have high sales growth but such firms have higher future earnings and positive future stock returns. The growth explanation would predict that high sales growth firms would have low future earnings and lower future returns.

[5] Cooper et al. (2008) document a negative relation between firm total asset growth and future stock returns; Fairfield Whisenant and Yohn (2004) document a negative relation between changes in net operating assets and future returns; thus both studies use growth proxies that capture accruals. Zhang (2007) uses employee growth, but employee growth does not subsume the accrual anomaly (see Chu 2011).

A different growth-related explanation is offered in Desai et al. (2004). This study suggests that high accruals identify 'glamour' stock while low accruals identify 'value' stock. They show that the ratio of cash flow to price is positively related to future stock returns and subsumes the accrual anomaly. They suggest that this evidence is consistent with investors over-extrapolating growth prospects in high accrual firms rather than with earnings fixation. Yet their cash flow to price ratio should capture both investor fixation on earnings (because cash flows are the more persistent component of earnings) and the well-know value glamour anomaly (because they deflate by price). In other words, they seem to combine two existing anomalies rather than demonstrating that one subsumes the other.

Finally, Wu, Zhang and Zhang (2010) provide what they call the 'q-theory' hypothesis to explain the accrual anomaly. Intuitively, their idea is based on the idea that the discount rates used by firms' managers to evaluate investments vary considerably both across firms and over time. So if a manager wakes up one morning to discover that her firm's discount rate has dropped, the manager will increase investment (causing high accruals), and then diminishing returns to new investment will set in, leading to both lower future earnings and stock returns. Note that the q-theory allows for a potentially rational link between accruals and future returns. If these movements in discount rates occur for rational reasons, then rationally lower discount rates should lead to rationally higher accruals and rationally lower future returns. Of course, all these predictions would still hold if discount rates jumped about for irrational reasons. For example, money poured into the Internet sector during the 'tech bubble' of the late 1990s, caused increased investment and lower future returns. But many observers attribute the tech bubble to irrationally low discount rates (e.g., Shiller, 2000).

The evidence in support of q-theory presented by Wu et al. (2010) suffers from many of the shortcomings discussed earlier. First, the underlying reason for the variation in discount rates is not identified. Second, the evidence in Hirshleifer et al. (2011) suggests that it is the accrual characteristic rather than the accrual factor that predicts future stock returns. This makes it difficult to attribute any related variation in discount rates to rationally priced risk. Third, the finding that the accrual anomaly is not subsumed by other measures of growth is difficult to reconcile with diminishing returns to new investment driving the accrual anomaly.

A final problem for the q-theory is that its predictions apply to all investments made by firms, including investments in R&D and marketing. R&D and marketing investments are particularly interesting, because they must be immediately expensed for accounting purposes even though they result in expected future benefits. Thus, the q-theory predicts these investments will have a negative relation with future earnings and stock returns, while the earnings fixation theory predicts a positive relation (because they must be immediately expensed, causing current earnings to be lower). The evidence supports the earnings fixation theory and is inconsistent with the q-theory. Chan, Lakonishok and Sougiannis (2001) find no evidence that high R&D firms have lower future returns and some evidence that they have higher future returns. Penman and Zhang (2002) show that firms with unusually high R&D and marketing expenditures have higher future earnings and stock returns.

5.4 Summing Up on Competing Explanations

So where does all this leave us? Here is our opinion. First, the accrual anomaly is unlikely to be attributable to rationally priced risk. The idea that investors are rationally pricing some sort of risk that has eluded academics for many years seems far-fetched. The possibility that research design flaws drive the accrual anomaly also seems far-fetched. But the growth explanation is more difficult to rule out. There is little doubt in our minds that there are diminishing returns to new investment and that investors and managers sometimes overinvest in response to behavioral biases such as irrational exuberance. But can the accrual anomaly be completely explained by growth-related explanations? We think not. A large body of evidence ties the accrual anomaly to the earnings fixation explanation. Moreover, the fact that we do not observe similar anomalies for investments that have to be expensed immediately for accounting purposes contradicts the growth explanation and corroborates the earnings fixation explanation.

It seems likely to us that both the growth and earnings fixation explanations are at work and often reinforce each other. The recent financial crisis provides a good case in point. In the lead-up to the crisis, many banks were able to report strong profits by recklessly issuing loans that were unlikely to be repaid. The banks capitalized the promised future payments of these loans on their balance sheets, resulting in high accruals and earnings.[6] They were able to report high earnings because they did not adequately allow for the likelihood that the promised payments would not be made. Moreover, these very profits encouraged the banks to make even more reckless loans and encouraged investors to supply them with even more capital. In other words, fixation on earnings was a primary determinant of overinvestment in bad loans. If the banks had increased their allowance for loan losses so as to indicate that the loans were expected to be unprofitable, banks and investors would have been less likely to continue investing in bad loans. In other words, overinvestment is much more likely when the accounting overstates the future benefits associated with current investment. This highlights the critical importance of having good accounting principles that prevent managers from overstating the expected future benefits from current investment.

6. Practical Implications

So can you make money from the accrual anomaly? Well, we have both good and bad news. We'll start with the bad news. Mashruwala, Rajgopal and Shevlin (2006) show that the accrual anomaly is concentrated in small thinly traded stocks with volatile stock returns and so involves considerable arbitrage risk. Also, recall that the hedge portfolio strategies constructed in accrual research involve short positions. In practice, these short positions could be difficult and costly to implement. Thus, while the accruals anomaly is one of the most robust anomalies ever discovered, the risks and costs involved in exploiting it are significant.

But to make things worse, a recent paper by Green et al. (2010) indicates that the accrual anomaly started to disappear around the year 2000 (that's four years after the

[6] Interestingly, many of the banks also went to great lengths to place the receivables in special purpose entities that allowed them to remove the associated accruals from the balance sheet and in many cases booked even higher earnings through the recording of associated 'gains on sale' (see Dechow, Myers and Shakespeare, 2010).

publication of Sloan's original paper). They conjecture that the decline of the accrual anomaly is at least partly due hedge funds trying to exploit the anomaly. Anecdotal evidence supports their conjecture. For example, several of the academics that conducted early research on the accrual anomaly were subsequently hired by hedge funds.

So now that we have told you the accrual anomaly has been largely arbitraged away, what is the good news? The good news lies back in Sloan's original 1996 paper. Sloan's original research was motivated by the idea that good fundamental analysis should facilitate the evaluation of the quality of earnings. And if other investors haven't done their homework, it should also facilitate the identification of mispriced securities.

Simply ranking firms on accruals hardly constitutes good fundamental analysis. What made Sloan's approach so novel at the time was that it could be easily applied using standardized financial statements in computerized databases. In other words, Sloan did some very sloppy fundamental analysis, but he did it on a very large number of firms in an expedient manner. What Sloan did is very easy to copy, so it stands to reason that investors caught on to it and arbitraged it away. But his results serve to highlight the potential gains from more thorough fundamental analysis that can distinguish between 'bad' accruals that will reverse and 'good' accruals that correctly anticipate future benefits.

Thorough fundamental analysis involves getting to know a firm and conducting a detailed evaluation of its financial statements. Such analysis, properly conducted, will never go out of style and is essential for keeping securities markets reasonably efficient. We expect that the lasting lesson from Sloan (1996) will be that 'leading edge' fundamental analysis will always facilitate the evaluation of earnings quality and the identification of mispriced securities. As time goes by, the technology of fundamental analysis should improve. This in turn should improve the efficiency of capital markets, which are the lifeblood of capitalist economies. If we are right, this should be good news for all of us!

Appendix A: Estimation and Testing Framework used in Sloan (1996)

This appendix summarizes Sloan's formal equations and statistical tests. Sloan (1996) used an econometric approach developed by Mishkin (1983) to infer investors' expectations from security prices. This technique has been used extensively by follow up research. The technique estimates both a 'rational' forecasting equation and a pricing equation from which the forecasting equation that is being used by investors is inferred. By comparing the estimated parameters from the rational forecasting equation to those in the pricing equation, we can test Sloan's hypothesis that investors fixate on earnings.

Sloan begins with the following basic earnings forecasting regression:

$$\text{Earnings}_{t+1} = \alpha_0 + \alpha_1 \text{Earnings}_t + \upsilon_{t+1} \quad (1)$$

This equation indicates that we can forecast next year's earnings using this year's earnings. The estimated coefficient α_1 measures the persistence of earnings. Recall from Figure 2A that earnings are slowly mean reverting, which means that we expect α_1 to be somewhat less than one. Sloan reports that α_1 equals 0.84, indicating that approximately 84% of current year earnings persists into next year. If investors 'fixate' on earnings and ignore information in accruals and cash flows, they should use this forecasting equation.

Sloan next decomposed earnings into cash and accrual components and examined the following forecasting equation. Recall from Figure 2 that the accrual component of earnings is less persistent than the cash component, so Sloan estimated the following modified version of equation (1):

$$\text{Earnings}_{t+1} = \gamma_o + \gamma_1 \text{ Accruals}_t + \gamma_2 \text{ Cash Flows}_t + \nu_{t+1} \quad (2)$$

Sloan hypothesized that γ_1 would be less than γ_2. This is just another way of saying he expected the accrual component to be less persistent than the cash component. Consistent with his hypothesis, he found that γ_1 was 0.77 and γ_2 was 0.91. In other words, only 77% of earnings that is made up of accruals persist into the next year, while 91% of earnings that is made up of cash flows persists into the next year. This result formalizes Sloan's hypothesis that the accrual component of earnings is of lower quality than the cash component.

The next step is to determine whether investors use forecasting equation (1) or forecasting equation (2). If investors fixate on earnings, as Sloan hypothesized, they should use (1). But if they are more sophisticated and recognize that accruals are of lower quality than cash flows, they should use (2). To do this, Sloan estimates the following equation:

$$\text{Returns}_{t+1} = \beta\nu_{t+1} + \varepsilon_{t+1} = \beta(\text{Earnings}_{t+1} - \gamma_o^* - \gamma_1^* \text{ Accruals}_t - \gamma_2^* \text{ Cash Flows}_t) + \varepsilon_{t+1} \quad (3)$$

This equation says that the security returns in year t+1 respond to the unexpected portion of earnings in year t+1, with β representing the valuation multiplier or 'earnings response coefficient'. The expression in parentheses represents unexpected earnings, which is equal to actual earnings for period t+1, less the forecast of earnings for period t+1 using

information about accruals and cash flows in period t. Note that the persistence coefficients in this equation represent those that are embedded in stock prices, and are not necessarily equal to the rational coefficients in equation (2). If investors fixate on earnings, as in equation (1), then $\gamma_1^* = \gamma_2^* = \alpha_1 = 0.84$. If, however, investors understand the lower quality of the accrual component of earnings, then $\gamma_1^* = \gamma_1 = 0.77$ and $\gamma_2^* = \gamma_2 = 0.91$.

The estimated values of these parameters turned out to be $\gamma_1^* = 0.91$ and $\gamma_2^* = 0.83$. These point estimates are very close to those predicted by the earnings fixation story and are inconsistent with investors understanding the lower quality of the accrual component of earnings. Note that while the rational forecasting equation yields $\gamma_1 < \gamma_2$, the pricing equation yields $\gamma_1^* > \gamma_2^*$. This indicates that, if anything, investors think the accrual component of earnings is <u>more</u> persistent than the cash component! It is important to note that the difference between γ_1^* and γ_2^* is not statistically significant, so the data are consistent with the hypothesis that investors fixate on earnings.

One final point we make in closing regards the Mishkin estimation framework. Subsequent research has leveled criticisms at the use of this framework (e.g., Kraft, Leone, and Wasley (2007) and Lewellen (2010)). Equations (1), (2) and (3) could have been estimated using ordinary least squares (OLS). The main issue that would be encountered using standard OLS would be the lack of direct estimates and associated standard errors for γ_1^* and γ_2^*. This is because OLS estimation would be of the following form:

$$\text{Returns}_{t+1} = \beta\text{Earnings}_{t+1} - \beta\gamma_o^* - \beta\gamma_1^* \text{Accruals}_t - \beta\gamma_2^* \text{Cash Flows}_t + \varepsilon_{t+1} \quad (4)$$

and so would return estimates of $\beta\gamma_1^*$ and $\beta\gamma_2^*$. The Mishkin framework extracts the underlying parameter estimates by using non-linear least squares estimation, but is asymptotically equivalent to OLS. Thus, the Mishkin approach allows us to directly estimate and test hypotheses relating to fixation on earnings.

The criticism made by Kraft, Leone and Wasley (2007) and Lewellen (2010) is that something else could be correlated with both accruals and future stock returns and this 'something else' could be the real cause of all the results. This is what is commonly known in the academic circles as a 'correlated omitted variable'. But unless 'something else' can be identified and a compelling reason offered as to why it should be correlated with future returns, this sort of criticism is empty.

Finally, if you refer back to equation (3), you will see that the magnitude of the predictable returns associated with accruals is determined by three parameters. The first is β, the valuation multiplier. The bigger the stock returns to an earnings surprise, the greater the predictable returns to a predictable earnings surprise. The second is γ_1, the persistence of the accrual component of earnings. The lower the persistence of the accrual component of earnings, the stronger the negative relation between accruals and future stock returns. The third is γ_2, the persistence of the cash flow component of earnings. The higher the persistence of the cash flow component of earnings, the stronger the negative relation between accruals and future stock returns (because investors fixate on earnings and higher cash flow persistence leads to higher earnings persistence). Shi and Zhang (2011) check to see whether the accrual anomaly is in fact higher where Sloan's hypothesis predicts it will be. They find that the accrual anomaly is higher both when β is higher and when $(\gamma_2 - \gamma_1)$ is higher. An investment strategy going long (short) in low (high) accrual

firms with high β and (γ_2- γ_1) yields hedge portfolio returns of an astounding 69% annualized return. It should, however, be noted that the breadth of this strategy is small and it tends to concentrate in smaller and more volatile securities.

Appendix B: Details on the broader definition of accruals

This appendix is provided to show you how to decompose a balance sheet into various categories of "accruals." **Exhibit 3** provides Harley Davison's balance sheet. We chose Harley Davidson because its balance sheet contains many different line items. As we mentioned in the simple example discussed in Section 2.1, all line items on the balance sheet are subject to accounting rules. Even cash is subject to accounting rules and measurement issues (e.g., foreign currency translation, definition and measurement of cash equivalents). However, some accounts are measured with more reliability than others. Richardson, Sloan, Soliman, and Tuna (2005) argue that the lower the reliability of measurements in an account, the more likely it will reflect future benefits with error and the lower the associated earnings persistence.

The first column of **Exhibit 3** classifies each line item according to whether the line item relates to an operating or financing activity. Cash and short-term marketable securities are classified as financial assets, since they are financial in nature and unrelated to primary business operations. The remaining assets are classified as operating assets since they are related to the underlying business operations. Liabilities are classified as operating, with the exception of those representing debt financing, which are classified as financing. The second column reports Richardson et al.'s assessment of the reliability of each line item. Operating assets are all classified as having low reliability. This is because they tend to involve subjective assessments on the part of management. For example, accounts receivable involves the assessment of credit risk and the associated allowance for uncollectibles. If these assessments are incorrect, earnings will be misstated and the misstatement will have reverse in another period. Liabilities, such as accounts payable, involve less subjective assessment and so have higher reliability. The key exceptions are pensions and other postretirement liabilities. Note that Harley Davidson has finance receivables held for sale and investment. Should these finance receivables be classified as financial assets or operating assets? We classify them as operating assets, since they arise from credit provided to customers and distributors and so their measurement directly impacts Harley's operating income.

[Exhibit 3 here]

We now define total accruals (TACC) as the change in all balance sheet accounts aside from cash. Total accruals consists of three categories (see bottom of Exhibit 3):

Change in non-cash working capital (ΔWC)=
Change in current operating assets (ΔCOA) – Change in current operating liabilities (ΔCOL)

Change in non-current net operating assets (ΔNCO) =
Change in non-current operating assets (ΔNCOA) – Change in noncurrent operating liabilities (ΔNCOL)

Change in net financial assets (ΔFin) =

Change in financial assets (ΔFinA) – Change in financial liabilities (ΔFinL):

ΔTACC = ΔWC + ΔNCO + ΔFin

Note that:

Equity = Assets – Liabilities = Cash + WC + NCO + Fin

And so:

ΔEquity = ΔCash + ΔWC + ΔNCO + ΔFin

Now recall from your accounting classes that the change in the book value of equity equals income less net distributions of income (i.e., dividends):

ΔEquity = Income – Dividends

where, Dividends are the net cash distributions made to investors (dividends plus repurchases less equity issuances). Substituting (Income – Dividends) for ΔEquity and rearranging gives:

Income = Dividends + ΔCash + ΔWC + ΔNCO + ΔFin

This expression indicates that income can be decomposed into a cash component, composed of dividends plus the increase in the cash balance[7] and an accrual component composed of working capital accruals, noncurrent operating assets and the change in net financial assets.

We can further define the change in net operating assets (ΔNOA) as:

ΔNOA = ΔWC + ΔNCO

You can see from **Exhibit 3** that the change in working capital (ΔWC), for Harley is -2,147,277, (-25.9% of average assets). This level of ΔWC is in the bottom 10 percent of all firms listed on Compustat. In contrast, the change in noncurrent net operating assets (ΔNCO) is 2,759,810, (32.5% of average assets). This level of ΔNCO is in the top 10 percent of all firms listed on Compustat. In contrast, the change in net operating assets (ΔNOA) is 612,533, (7% of average assets) and puts Harley Davidson in the middle of the Compustat distribution of ΔNOA. Thus, we get different signals of earnings quality using different measures of accruals and so what should we do?

A careful examination of the balance sheet (and a reading of the footnotes) can explain the conflicting signals. In the second quarter of 2009, Harley ended its practice of meeting accounting requirements to use "gain on sale" accounting for its receivables. This change in accounting practice did not necessarily reflect a change in the Harley's underlying business, but

[7] Dechow, Richardson and Sloan (2008) show that the portion of the cash component attributable to dividends is more persistent than the portion of the cash component attributable to the change in the cash balance. This insight can be used to construct even more refined measures of earnings quality and improved trading strategies.

it did change their balance sheet. Harley reclassified several billion dollars of receivables from held for sale (current assets) to held for investment (noncurrent assets) and this is a major driver of the different signals we obtained using working capital accruals versus non-current operating accruals.

The take-away from this exercise is that it is important to understand what is driving extreme accruals before jumping to conclusions about earnings quality. In Harley's case, the extreme accruals were the result of a change in an accounting procedure, whereas as in KB Homes case, the extreme accruals were the result of slowing demand and associated inventory buildups. These are quite different reasons for extreme accruals and have different implications for future earnings.

A final issue is whether to use the balance sheet or the statement of cash flows to calculate accruals. We have used the balance sheet. Another procedure for estimating the components of accruals is as follows (where * indicates that the variable is obtained from the statement of cash flows):

ΔWC* = Income + Depreciation and Amortization* – Cash from Operating Activities*

ΔNOA* = Income – Cash from Operating Activities * – Cash from Investing Activities*

TACC* = Income – ΔCash*– Dividends

Which approach is better is unclear. The statement of cash flows doesn't list accruals relating to noncash activities (e.g., reclassifications between two non cash accounts, capital lease transactions, stock-based acquisitions). The bottom line is that the accrual anomaly is strongest using the balance sheet approach. This is presumably because accruals related to noncash activities also result in lower earnings quality. However, we always recommend looking at the statement of cash flows and understanding any differences (see also Collins and Hribar, 2002). For example, in Harley's case, this would have alerted you to the fact that the drop in working capital accruals was attributable to a reclassification.

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Exhibit 1: Financial Statements for Peter and Paul's Lemonade Stands

Peter

Income statement	**Day 1**
Revenue	200
Expenses	
Lemonade	100
Cups	10
Rent of Lemonade Stand	10
Total expenses	*120*
Net Income	**80**

Balance sheet

Assets	**Beg.**	**End**
Cash	120	200
	-	-
	-	-
	-	-
Total Assets	**120**	**200**
Equity	**120**	**200**

Statement of Cash Flows (Direct)	**Day 1**
Cash from Operations	
Cash Revenue	200
Purchases of inventory	(110)
Rent of Lemonade Stand	(10)
Total Cash from Operations	***80***
Cash from Investing	
	0
Total Change in Cash	***80***
Beginning Cash Balance	120
Ending Cash Balance	200

Statement of Cash Flows (Indirect)	**Day 1**
Cash from Operations	
Earnings	80
Less Increase in Accruals	0
Total Cash from Operations	***80***
Cash from Investing	
	0
Total Change in Cash	***80***
Beginning Cash Balance	120
Ending Cash Balance	200

Cash Component of Net Income	80
Accrual Component of Net Income	0
Net Income	80

Paul

Income statement	**Day 1**
Revenue	200
Expenses	
Lemonade	100
Cups	10
Depreciation of Lemonade Stand	10
Total expenses	*120*
Net Income	**80**

Balance sheet

Assets	**Beg.**	**End**
Cash	2100	100
Accounts Receivable	-	100
Inventory	-	990
Property, Plant and Equipment	-	990
Total Assets	**2100**	**2180**
Equity	**2100**	**2180**

Statement of Cash Flows (Direct)	**Day 1**
Cash from Operations	
Cash Revenue	100
Purchase of Inventory	(1,100)
Total Cash from Operations	***(1,000)***
Cash from Investing	
Purchase of Lemonade Stand	(1,000)
Total Change in Cash	***(2,000)***
Beginning Cash Balance	2100
Ending Cash Balance	100

Statement of Cash Flows (Indirect)	**Day 1**
Cash from Operations	
Earnings	80
Add depreciation	10
Less Increase in Receivables	(100)
Less Increase in Inventory	(990)
Total Cash from Operations	***(1,000)***
Cash from Investing	
Purchase of Lemonade Stand	(1,000)
Total Change in Cash	***(2,000)***
Beginning Cash Balance	2100
Ending Cash Balance	100

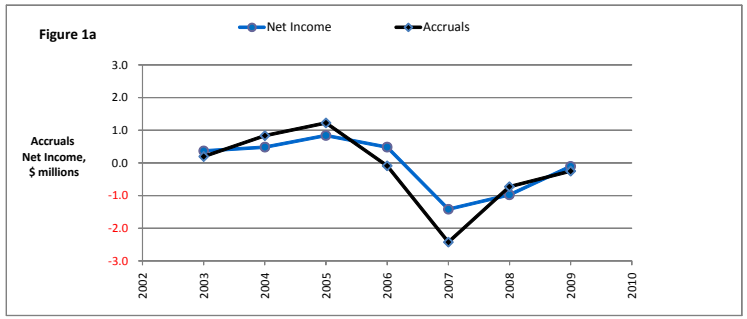
Cash Component of Net Income	(2,000)
Accrual Component of Net Income	2080
Net Income	80

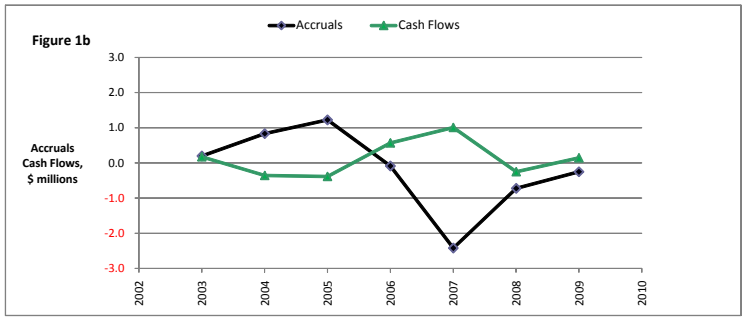
Exhibit 2: KB Homes Accrual Worksheet

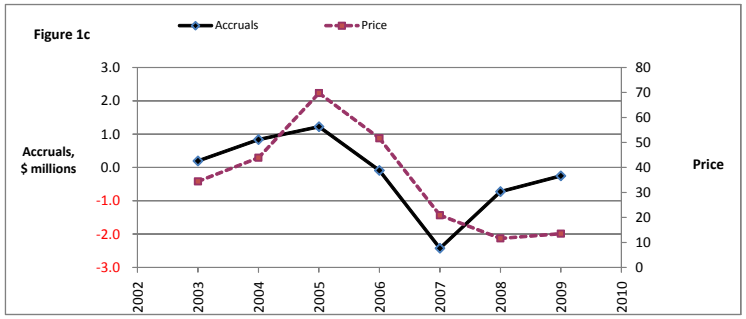
Financial Statement Figures in Millions of U.S. Dollars

Year Ended	Line	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets									
Cash & ST Investments	1	$330.0	$138.1	$234.2	$154.0	$654.6	$1,343.7	$1,256.9	$1,292.3
Accounts Receivable	2	982.5	642.1	662.7	584.3	662.4	298.4	359.0	339.3
Inventories	3	2,173.5	2,883.5	4,143.3	6,128.3	6,454.8	3,312.4	2,106.7	1,501.4
Other Current Assets	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Current Assets (Add line 1 through 4)	**5**	**3,486.0**	**3,663.7**	**5,040.1**	**6,866.6**	**7,771.8**	**4,954.6**	**3,722.6**	**3,133.0**
Current Liabilities									
ST Debt & Curr. Portion LT Debt	6	516.9	329.6	86.0	130.3	503.6	221.0	296.4	18.5
Accounts Payable	7	521.3	554.4	749.1	892.7	1,071.3	699.9	541.3	341.0
Income Tax Payable	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
Other Current Liabilities	9	466.9	606.4	855.9	1,393.2	1,706.3	993.6	730.9	554.9
Current Liabilities (Add line 6 through 9)	**10**	**1,505.1**	**1,490.4**	**1,691.0**	**2,416.2**	**3,281.1**	**1,914.5**	**1,568.5**	**926.9**
Current Net Operating Assets **(line 5 - line 1) - (line 10 - line 6 - line 8)**	*11*	*2,167.8*	*2,364.8*	*3,200.9*	*4,426.7*	*4,339.6*	*1,917.3*	*1,193.5*	*944.8*
Net Income	**12**	**314.4**	**370.8**	**480.9**	**842.4**	**482.4**	**-1,414.8**	**-976.1**	**-101.8**
Accrual Component of Net Income (Change in 11)	***13***		***197.0***	***836.1***	***1,225.8***	***-87.1***	***-2,422.3***	***-723.8***	***-248.7***
Implied Cash Component of Net Income (line 12 - line 13)	*14*		***173.7***	***-355.2***	***-383.4***	***569.4***	***1,007.5***	***-252.3***	***146.9***
Stock Price (in U.S. Dollars)		**22.35**	**34.44**	**43.95**	**69.77**	**51.69**	**20.89**	**11.63**	**13.55**

Figure 1: Time-series Plots of KB Home's Net Income, Accruals, Cash Flows, and Stock Price from 2003 to 2009







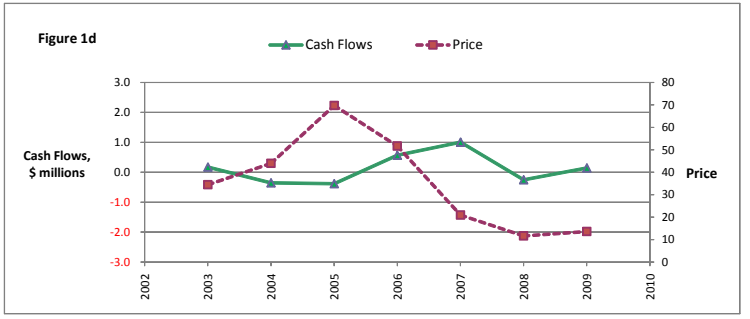
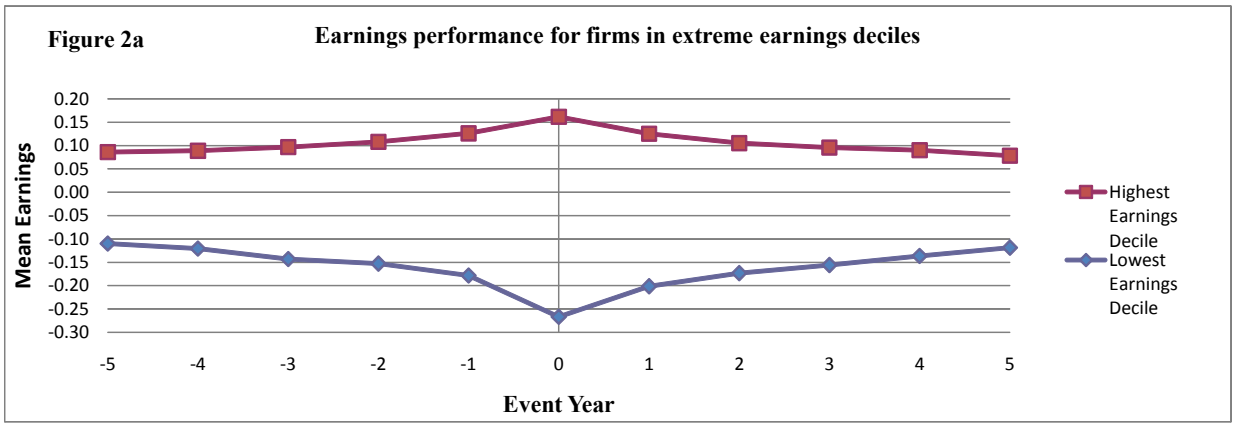
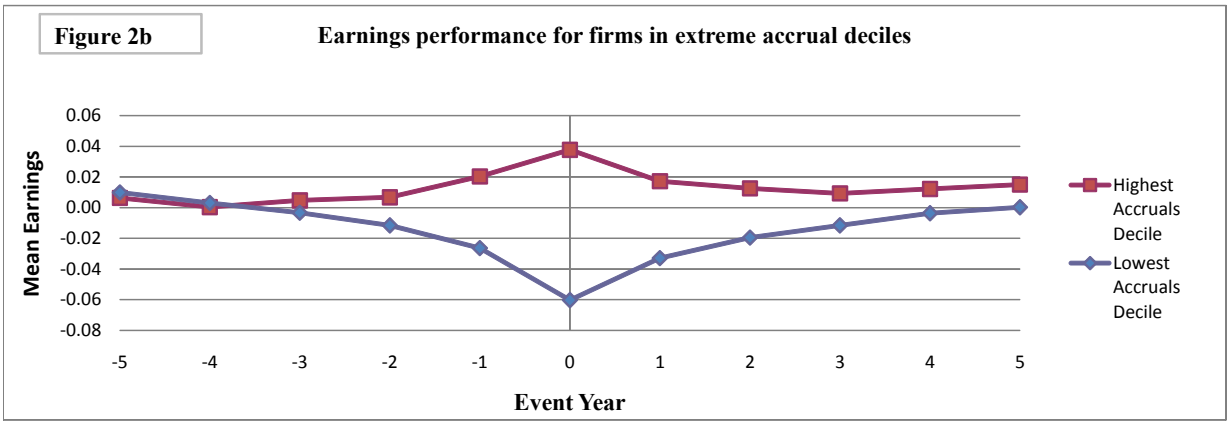


Figure 2: Time-series Plots of Earnings Performance for Extreme Deciles of Earnings, Accruals, and Cash Flows





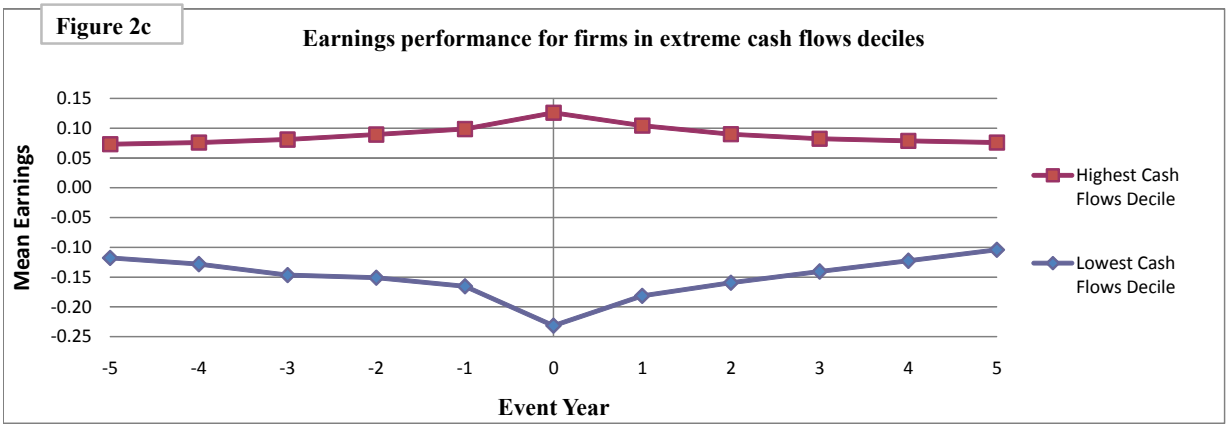


Table 1: Mean Portfolio Raw Returns for a Sample of 60,009 Firm-years from 1970 to 2007

Panel A: Accruals Decile Hedge Portfolio Returns

	Raw Returns		
Rank of Accruals	t+1	t+2	t+3
Lowest 1	0.212	0.171	0.171
2	0.184	0.158	0.182
3	0.166	0.148	0.175
4	0.168	0.153	0.157
5	0.154	0.152	0.158
6	0.170	0.131	0.157
7	0.149	0.153	0.197
8	0.151	0.144	0.154
9	0.126	0.126	0.178
Highest 10	0.102	0.128	0.161
Hedge (1 - 10)	**0.110**	**0.043**	**0.010**

Panel B: Cash Flows Decile Hedge Portfolio Returns

	Raw Returns		
Rank of Cash Flows	t+1	t+2	t+3
Lowest 1	0.143	0.159	0.162
2	0.151	0.163	0.165
3	0.186	0.168	0.169
4	0.160	0.148	0.172
5	0.146	0.140	0.185
6	0.146	0.137	0.175
7	0.154	0.138	0.173
8	0.161	0.133	0.161
9	0.162	0.143	0.171
Highest 10	0.171	0.134	0.158
Hedge (10 - 1)	**0.028**	**-0.025**	**-0.004**

Note: Portfolios are formed annualy by assigning firms into deciles based on the magnitude of accruals (Panel A) or Cash flows (Panel B).
Accruals is the change in non-cash current assets, less the change in current liabilities (exclusive of short-term debt and tax payable), divided by average assets. Cash flows is equal to Earnings before extraordinary items less accruals, divided by average assets.

Figure 3: Accrual Strategy Hedge Portfolio Returns for a sample of 60,009 firm-years from 1970 to 2006
(positive in 30 out of 38 years)

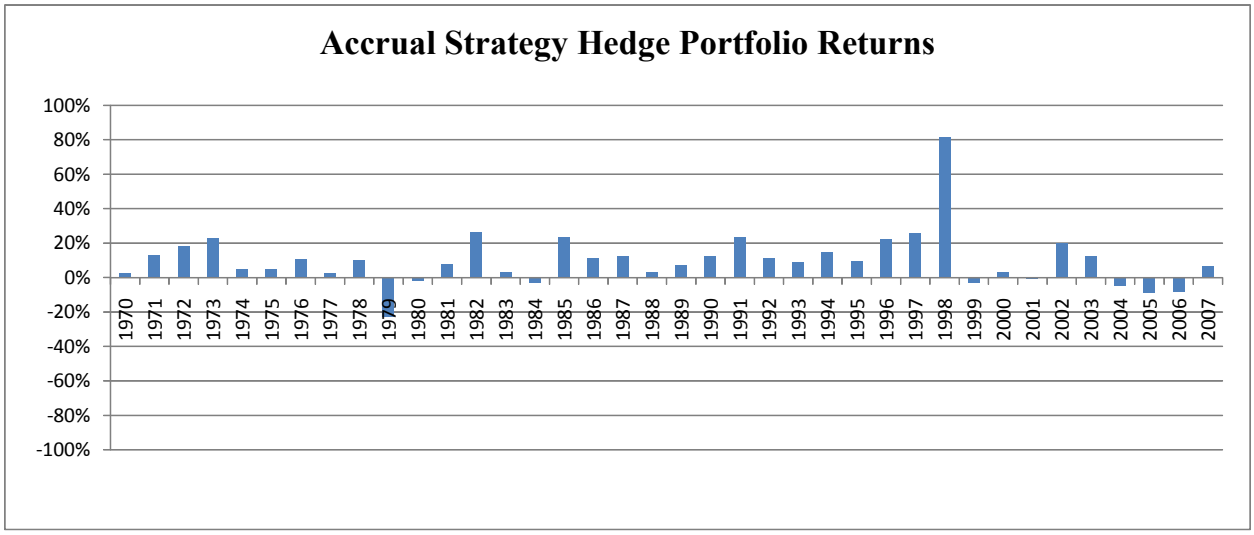


Figure 4: Cash Flows Strategy Hedge Portfolio Returns for a Sample of 60,009 Firm-Years from 1970 to 2007
(positive in 29 out 38 years)

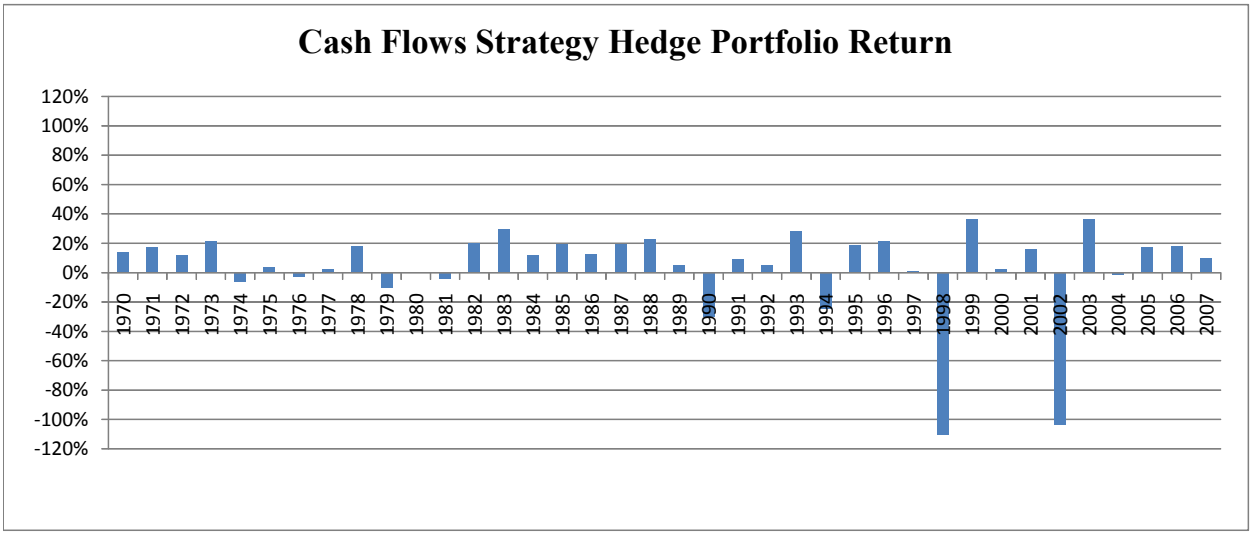


Table 2: Studies on the Global Accrual Anomaly

The table summarizes findings on the global accrual anomaly from Leippold and Lohre (2010) and Pincus, Rajgopal, and Venkatachalam (2007). We summarize Table VI of Leippold and Lohre (2010) and Table 6 of Pincus, Rajgopal, and Venkatachalam (2007). Alpha is the intercept of the regression of the accrual hedge portfolio return on the market portfolio, size and book-to-market portfolios, and essentially represent the abnormal hedge portfolio return adjusted for Fama and French risk factors. Alphas that are significant at a 10%-level are in italics, alphas significant at a 5%-level or better are in bold face. Alphas are given in percentage terms. GV denotes Global Vantage (Industrial/Commercial), Comp. denotes Compustat, DS denotes Datastream, and BSM stands for Balance Sheet Method. CGB-BMI denotes the Citigroup Bank Broad Market Indexes.

	Leippold and Lohre (2010)	Pincus et al. (2007)
Panel A: Data Characteristics		
Balance Sheet Data	DS	GV
Return Data	DS	GV Issues
Period	1994–2008	1994–2002
Sample Size	96,309 FY	62,027 FY
FY per year	6,879 FY	6,892 FY
Accruals Method	BSM	BSM
Panel B: Common Law Countries' Alphas		
Australia	**8.28**	**17.88**
Canada	5.40	**8.28**
Hong Kong	**25.92**	5.04
India	*11.64*	4.70
Ireland	-0.36	-
Malaysia	0.60	**8.64**
New Zeland	6.24	-
Singapore	3.12	1.44
Thailand	**13.56**	**20.64**
UK	*3.00*	**9.96**
US	**7.92**	**8.40**
Panel C: Code Law Countries' Alphas		
Belgium	-7.80	-
Denmark	**17.28**	*8.52*
France	4.56	*8.16*
Germany	**5.76**	*6.60*
Greece	3.84	-
Indonesia	19.08	-12.60
Italy	**11.04**	*11.76*
Japan	**3.96**	**5.76**
Netherlands	3.36	2.16
Norway	4.56	-
South Korea	**10.20**	-
Spain	-0.12	-6.96
Sweden	5.76	9.24
Switzerland	**11.64**	4.92
Taiwan	-5.52	-0.48
Total number of countries	26	20
Number of countries with positive hedge returns	22	17
Percent of countries with positive hedge	85%	85%
Number of countries with statistically significant positive hedge return (p-value<0.1)	12	11

Exhibit 3: Broadening the Definition of Accruals Using the Balance Sheet

HARLEY-DAVIDSON, INC.
CONSOLIDATED BALANCE SHEETS
December 31, 2009 and 2008
(In thousands)

	Measurement Reliability			**31-Dec-09**		**31-Dec-08**	Difference
		ASSETS					
		Current assets:					
Cash	High	Cash and cash equivalents	$	1,630,433	$	568,894	1,061,539
FinA	High	Marketable securities		39,685		0	39,685
COA	Low	Accounts receivable, net		269,371		265,319	4,052
COA	Low	Finance receivables held for sale		0		2,443,965	-2,443,965
COA	Low	Finance receivables held for investment, net		1,436,114		1,378,461	57,653
COA	Low	Inventories		323,029		379,141	-56,112
COA	Low	Assets of discontinued operations		181,211		238,715	-57,504
COA	Low	Deferred income taxes		179,685		123,327	56,358
COA	Low	Prepaid expenses and other current assets		282,421		128,730	153,691
		Total current assets		4,341,949		5,526,552	-1,184,603
NCOA	Low	Finance receivables held for investment, net		3,621,048		817,102	2,803,946
NCOA	Low	Property, plant and equipment, net		906,906		1,056,928	-150,022
NCOA	Low	Goodwill		31,400		60,131	-28,731
NCOA	Low	Deferred income taxes		177,504		288,240	-110,736
NCOA	Low	Other long-term assets		76,711		79,672	-2,961
			$	9,155,518	$	7,828,625	1,326,893
		LIABILITIES AND SHAREHOLDERS' EQUITY					
		Current liabilities:					
COL	High	Accounts payable	$	162,515	$	303,277	-140,762
COL	High	Accrued liabilities		514,084		503,466	10,618
COL	High	Liabilities of discontinued operations		69,535		77,941	-8,406
FinL	High	Short-term debt		189,999		1,738,649	-1,548,650
FinL	High	Current portion of long-term debt		1,332,091		0	1,332,091
		Total current liabilities		2,268,224		2,623,333	-355,109
FinL	High	Long-term debt		4,114,039		2,176,238	1,937,801
NCOL	Medium	Pension liability		245,332		484,003	-238,671
NCOL	Medium	Postretirement healthcare liability		264,472		274,408	-9,936
NCOL	Medium	Other long-term liabilities		155,333		155,040	293
		Total noncurrent liabilities		4,779,176		3,089,689	1,689,487
		Total shareholders' equity		2,108,118		2,115,603	-7,485
			$	9,155,518	$	7,828,625	1,326,893

Accruals Redefined				%Average Assets
ΔWC	Medium	ΔCOA-ΔCOL	-2,147,277	-25.29%
ΔNCO	Low	ΔNCOA-ΔNCOL	2,759,810	32.50%
ΔNOA	Medium	ΔWC + ΔNCO	612,533	7.21%
ΔFin	High	ΔFinA-ΔFinL	-1,681,557	-19.80%
TACC	Medium	ΔWC+ΔNCO+ΔFin	-1,069,024	-12.59%
ΔCash	High		1,061,539	12.50%
ΔEquity	Medium		-7,485	