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Percent accruals and the accrual anomaly: Korean evidence ☆

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ABSTRACT

Prior studies provide mixed evidence about whether the accrual anomaly exists in the Korean stock market. We seek to reconcile the mixed evidence by applying a different measure of accruals—accruals scaled by earnings (percent accruals)—in comparison to accruals scaled by total assets (traditional accruals). Based on 9399 firm–year observations for the 1994–2010 period, we find evidence of the accrual anomaly in the Korean stock market when using percent accruals but not when using traditional accruals. Of particular note is that when firms are sorted by traditional accruals, the lowest accrual decile includes firms with low cash flows, which leads to low returns that eliminate the abnormal returns of the accruals-based trading strategy. This also occurs when we use other firm-size proxies to deflate accruals. In contrast, when using percent accruals we find consistent evidence that the accrual anomaly exists regardless of research design specifications or sample selection criteria. Our findings suggest that percent accruals are a useful alternative to traditional accruals, especially in markets where the lowest traditional accrual decile exhibits very low returns.

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1. Introduction

The accrual anomaly is one of the most pervasive anomalies observed in U.S. equity markets (Fama and French, 2008). In a seminal study, Sloan (1996) shows that investors fail to incorporate the different persistence of the two earnings components—accruals and cash flows—into the pricing of stocks. To test this hypothesis, this study measures the magnitude of firms' accruals and cash flows scaled by total assets.[3] Following this approach, most subsequent studies on the accrual anomaly have used total assets as a deflator for accruals and cash flows. However, the original focus of the earnings fixation hypothesis in Sloan (1996) is not in the composition of returns on assets (ROA), but in the composition of earnings—the relative magnitude of accruals and cash flows of earnings. Thus, in line with Sloan's original motivation, earnings would be a more appropriate deflator for accruals than total assets. Focusing on this issue, Hafzalla et al. (2011) measure the magnitude of accruals relative to earnings ("percent accruals") rather than to assets ("traditional accruals") and find that hedge portfolio returns are much higher when percent accruals are used. They also find that this improvement is attributable mainly to stocks in the lowest percent accrual decile, which yield much higher returns than the stocks in the lowest traditional accrual decile. Hafzalla et al. (2011), argue that percent accruals better identify under-valued stocks, which generally belong in the lowest accrual decile.

Using traditional accruals as their measure, several studies (e.g., Pincus et al., 2007) follow the accrual anomaly studies on U.S. markets to show that the anomaly exists in non-U.S. markets, such as those in Australia, the United Kingdom, New Zealand, and Japan. However, to the best of our knowledge, few studies have applied percent accruals to non-U.S. markets. By using percent accruals, we examine whether the accrual anomaly exists in the Korean stock market.

Korea provides an interesting setting to test the usefulness of percent accruals in identifying the accrual anomaly. We believe that, to constitute a proper setting for testing the usefulness of percent accruals, a country should satisfy the following two conditions: First, most investors in the country's stock market should pay special attention to the level of unscaled earnings. This issue is important because the accrual anomaly measured by percent accruals stem from the identification of mispriced stocks based on the magnitude of accruals over earnings. Second, prior studies should either fail to find evidence of the accrual anomaly or provide at most some mixed evidence when using traditional accruals, especially due to the negative returns of stocks in the lowest traditional accrual decile.

In our view, Korea satisfies these two conditions. First, unlike the United States, where investors focus mainly on earnings per share (EPS) (Graham et al., 2005), in Korea, most market participants including the news media and investors focus mainly on the level of unscaled earnings (see Appendix A).[4] Thus, in Korea, sorting firms by percent accruals is more likely to place mispriced stocks into extreme decile portfolios than by traditional accruals. Second, the prior literature using traditional accruals provides conflicting conclusions on the existence of the accrual anomaly in Korea. In particular, the studies that have failed to find abnormal returns from the accruals-based hedge portfolio attribute this lack of evidence to the very low returns of the lowest traditional accrual decile (Nam, 2009). By contrast, studies that do find evidence of the accrual anomaly document that the hedge portfolio returns are driven by negative returns from the highest traditional accrual decile (short position) and that the returns from the lowest traditional accrual decile (long position) tend to be small (Hwang et al., 2005).[5] Taken together, the abnormal returns from the lowest accrual decile seem to

[3] Because of scaling, what Sloan (1996) decomposes is not earnings but returns on assets. He decomposes returns on assets (ROA) into AROA and CROA. We define 'accruals returns on assets' (AROA) as accruals divided by total assets, and 'cash flows returns on assets' (CROA) as cash flows divided by total assets.

[4] Appendix A compares typical examples of (1) earnings announcements of Korean and U.S. firms and (2) Korean and U.S. press coverage of these events. For Hynix, a typical Korean firm, both its earnings announcement (Table A1) and Korean press coverage of the event (Table A3) focus on the level of earnings, not EPS. In contrast, for Apple, which is a typical U.S. firm, both its earnings announcement (Table A2) and the U.S. press coverage of the event (Table A4) mention not only the level of earnings but also EPS. We examine *Maeil Business Newspaper*, a prominent business press in Korea, for articles addressing Korean firms' earnings announcements from 2009 through 2010. We confirm that the Hynix case is typical and almost every article mentions only the level of earnings.

[5] Sloan (1996) argues that the lowest (highest) accrual decile portfolio generates abnormal positive (negative) returns because investors cannot distinguish the different persistence of accruals and cash flows. Thus, there is no particular reason why stocks in the highest accrual decile are overvalued while stocks in the lowest accrual decile are correctly priced.

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determine whether prior studies find evidence of the accrual anomaly in Korea. This last point is critical, as it strongly suggests that percent accruals—because they effectively select firms with undervalued accruals for the lowest accrual decile—are likely to provide a good approach to detecting the accrual anomaly in Korea.

Our two-fold purpose is to re-examine whether the accrual anomaly exists in the Korean stock market by using earnings as a deflator for accruals and to explain why the lowest traditional accrual decile has low returns, thereby making the accrual anomaly disappear whereas using percent accruals indicates the existence of the accrual anomaly.

We summarize our findings as follows. First, the accrual anomaly exists when percent accruals are applied, but no such anomaly seems to exist when traditional accruals are used. Specifically, a hedge portfolio based on percent accruals yields about 18.07% whereas a hedge portfolio based on traditional accruals yields about −3.80% during our sample period (1994–2010). More surprisingly, the percent accruals-based trading strategy never results in a loss during the 17 years of this study period (1994–2010). By contrast, the traditional accruals-based trading strategy generates positive returns in only 8 out of 17 years. We conduct both the CAPM regression and the Fama–French three-factor time-series regression, which confirm the presence of the percent accrual anomaly. Unlike prior studies where the accrual anomaly exists only for profit firms, we find that the accrual anomaly exists regardless of the sign of earnings.

Next, we identify the source of relatively low returns in the lowest traditional accrual decile. These low returns eliminate any abnormal returns of the accruals-based trading strategy in the Korean stock market. Surprisingly, we find that a significant number of stocks in the lowest traditional accrual decile are also included in the lowest traditional cash flow decile.[6] These stocks perform worse than other stocks in the lowest traditional accrual decile. For example, they exhibit much lower past asset growth and past sales growth than other stocks in the traditional accrual decile. More importantly, these stocks dampen the returns in the lowest traditional accrual decile and eliminate the abnormal returns from the accrual anomaly. When we exclude these stocks from the sample, stocks in the lowest traditional accrual decile turn out to yield much higher returns than before and the traditional accruals hedge portfolio returns become significantly positive. This finding indicates that using traditional accruals can lead to misclassification of the lowest accruals stocks.

We conduct three additional tests. First, we examine whether using other size-related deflators besides total assets also yields insignificant hedge returns. We specifically use three popular size proxies: market value of equity, book value of equity, and sales. The results maintain that the lowest accrual decile yields extremely low returns and insignificant hedge portfolio returns. Second, we compare the effect of research design choices on stock returns from percent accruals hedge portfolios and traditional accruals hedge portfolios. Following Taylor and Wong (2012), we focus on i) the definition of 'abnormal returns', ii) data-trimming methods especially for extremely large positive returns, and iii) the choice between equal and value-weighted accrual portfolio returns. We find that the percent accruals-based trading strategy outperforms the traditional accruals-based trading strategy regardless of research design choices. Lastly, we re-examine prior studies supporting the assertion that the accrual anomaly exists in Korea using the traditional accruals measure. We realize that prior studies use different sample selection criteria that usually eliminate firms with poor fundamentals. Thus, we run tests using two types of samples: i) a sample eliminating firms with poor fundamentals as in prior studies and ii) a sample that does not impose any such restrictions. We find that traditional accruals hedge returns are significantly positive only when we impose the sample selection criteria used in prior studies. By contrast, hedge returns based on percent accruals are significantly positive, regardless of the sample selection criteria.

We contribute to the literature in the following ways. First, we are the first to identify the potential problem of size proxies including total assets as a deflator for accruals in testing for the accrual anomaly. We show that using accruals deflated by size proxies tends to result in the misclassification of firms in the lowest accrual decile. In contrast, percent accruals are a useful alternative for addressing the problem of accruals deflated by size proxy variables. Second, we are the first to compare the robustness of trading strategies (percent accruals versus traditional accruals) to various research design choices. Third, we reconcile the mixed evidence on the existence of the accrual anomaly in Korea by showing that traditional accruals are sensitive to sample-selection criteria while percent accruals are robust to it. Fourth, we are the first to apply percent accruals to a non-U.S. market, especially to a country in which market participants pay special

[6] Traditional cash flows are defined as cash flows scaled by average total assets.

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attention to the level of earnings. This raises the possibility that the effectiveness of using percent accruals could be affected by whether market participants fixate on the level of earnings.

Our findings have immediate implications for accrual anomaly tests in other countries. As with studies based on U.S. data, to our knowledge, all prior studies focusing on countries other than the United States use traditional accruals to test for the accrual anomaly (Chan et al., 2006; Clinch et al., 2012; Koerniadi and Tourani-Rad, 2007). We raise the possibility here that the accrual anomaly, which reportedly does not exist in other countries, could actually exist but is detected only when percent accruals are used.

In addition to academic contributions, we also provide direct implications for practitioners. Our findings show that the hedge portfolio based on percent accruals in the Korean stock market yields stable positive returns. In late 2011, the Financial Supervisory Commission (FSC) granted permission to only a limited number of securities companies that meet certain qualifications to manage hedge funds.[7] Investors in the Korean stock market are concerned whether hedge funds have more profitable trading strategies than those employed by Korea's existing mutual funds. We propose a trading strategy that hedge funds can easily implement to improve their investment performance.

The remainder of the paper is organized as follows. Section 2 reviews related literature. Section 3 presents the definition of traditional and percent accruals. Section 4 describes the sample and descriptive statistics. Section 5 reports the empirical results. Section 6 concludes the paper.

2. Prior literature

2.1. Studies on the accrual anomaly

Sloan (1996) documents evidence that firms with low accruals yield higher stock returns than firms with high accruals. This phenomenon was named the 'accrual anomaly' in subsequent studies. The influence of Sloan (1996) on the accounting and finance academia as well as the finance industry has been huge. In academia, hundreds of accrual anomaly studies were spurred by Sloan (1996).[8] In the finance industry, Sloan and his colleagues were hired by large U.S. asset management companies, and many hedge funds adopted the accruals-based trading strategy (Green et al., 2011).

The original idea of Sloan (1996) is to test whether investors are fixated on reported earnings without distinguishing the different persistence of the two components of earnings, accruals and cash flows. This idea is called the earnings fixation hypothesis. While Sloan (1996) tests for the earnings fixation hypothesis, interestingly, accruals and cash flows are scaled by average total assets. The choice of the deflator does not constitute a central focus in his research design. Regarding this issue, Sloan (1996) states: "…empirical analysis requires cross-sectional and temporal comparisons of the magnitude of earnings performance and the relative magnitude of the accruals and cash flows components of earnings. Accordingly, all three variables are standardized by firm size to facilitate such comparisons. The measure of firm size employed is total assets, measured as the average of the beginning and end of year book value of total assets" (p. 294). Most subsequent accrual anomaly studies keep using total assets, not earnings, to standardize accruals. However, to test the original idea—the earnings-fixation hypothesis—proposed by Sloan (1996), we believe that earnings are a better deflator than total assets for the following reason. What Sloan (1996) decomposes is not the level of earnings, but ROA (i.e., earnings over total assets); in fact, he decomposes ROA into AROA and CROA. However, the earnings fixation hypothesis does not rest on the assumption that investors fixate on ROA in particular per se. Rather, the focus of the hypothesis is on whether investors distinguish the different persistence of the two components of earnings. Hafzalla et al. (2011) are the first to realize this subtle difference and provide evidence that the deflator for accruals plays an important role in accrual anomaly studies. Specifically, by redefining accruals relative to earnings rather than relative to total assets, Hafzalla et al. (2011) show that percent accruals produce a radically different sort of data from traditional accruals and that the trading strategy based on percent accruals generates much higher returns than that based on traditional accruals. Furthermore, much of the improvement in returns to the percent accruals-based trading strategies is

[7] The FSC is a Korean government body responsible for financial policy and financial supervision.

[8] Regarding anomalies, Richardson et al. (2010) list the ten most highly cited papers published since 2000 in finance journals and accounting journals respectively: three of the ten papers in finance journals are related to the accrual anomaly, and nine of the ten papers in accounting journals are related to the accrual anomaly.

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attributable to the long position, the lowest percent accrual decile. In terms of trading strategy implementation, this finding is important in the sense that the long position entails lower transaction costs and is less prone to other types of limits to arbitrage than the short position. This evidence strongly supports the earnings fixation hypothesis.

In contrast to the United States, where the accrual anomaly has been robustly observed, prior studies provide mixed evidence for the existence of the accrual anomaly in Korea. Studies supporting the existence of the accrual anomaly in the Korean stock market include Hwang et al. (2005) and Na (2006).[9] Specifically, Hwang et al. (2005) report the existence of the accrual anomaly in Korea by using data about firms listed on the KSE (Korea Stock Exchange) during the 1994–2002 period. Na (2006) also concludes that the accrual anomaly exists in Korea, using data from the 1981–2001 sample period.

On the contrary, there are studies that document evidence that is against the existence of the accrual anomaly or can at the most only provide partial support for the anomaly. For example, Yi et al. (2008) assert that the accrual anomaly exists only for firms that report profits, not for all KSE listed firms. In confirming the findings of Yi et al. (2008), Nam (2009) further argues that the main reason for this non-existence of the accrual anomaly is the stocks in the lowest accrual decile. The results show that the lowest accrual decile exhibits lower returns than the second lowest accrual decile and that returns to the lowest accrual decile are as low as returns to the highest accrual decile. After excluding stocks in the lowest accrual decile from the full sample, he finds significantly positive abnormal returns to the accruals-based trading strategy and concludes that stocks in the lowest accrual decile explain why there is no evidence of the accrual anomaly in Korea. However, Nam (2009) offers no explanation as to why stocks in the lowest accrual decile yield returns as low as the stocks in the highest accrual decile. In this regard, Korea provides an interesting research setting for using percent accruals to test for the accrual anomaly because percent accruals are more effective at identifying firms for the lowest decile (Hafzalla et al., 2011). Using percent accruals as a remedy for extremely low returns in the lowest accrual decile, we investigate (i) whether or not the accrual anomaly exists in Korea and (ii) why the traditional accruals-based trading strategy delivers lower abnormal returns than the percent accruals-based trading strategy.

Although we use percent accruals, as in Hafzalla et al. (2011), our work differs from theirs in four aspects. First, we identify the source of the relatively low returns for the lowest traditional accrual decile. Specifically, we find that firms that belong to both the lowest accrual decile and the lowest cash flow decile have extremely low returns, eliminating the abnormal returns to the accruals-based trading strategy. We also find that these firms tend to be financially distressed. By contrast, Hafzalla et al. (2011) do not explore the sources that lead to the difference in hedge returns between percent accruals portfolios and traditional accruals portfolios. Second, we investigate several research design choices that could affect hedge returns, while Hafzalla et al. (2011) use only one research design choice. Third, we show that accruals-based hedge portfolio returns are insignificant when using other firm-size proxies, besides total assets, to deflate accruals. In contrast, Hafzalla et al. (2011) use only total assets to deflate accruals. Fourth, we explore why several studies based on the traditional accruals measure support the existence of the accrual anomaly in Korea.

There are studies that question the robustness of the accrual anomaly. For instance, Kraft et al. (2006) find an inverted U-shaped relation between accruals and stock returns by deleting 1% of their total sample[10] or by deleting 93 firms with buy-and-hold returns exceeding 200%. Taylor and Wong (2012), using Australia data, extend Kraft et al. (2006) by examining the effects of several research design choices on hedge returns. Specifically, they focus on four dimensions: i) the estimation method of accruals, ii) the definition of abnormal returns, iii) data trimming methods especially for extremely large positive returns, and iv) the choice between equal- and value-weighted accrual portfolio returns.[11] Among the four dimensions considered, they find that the accrual anomaly is particularly sensitive to data trimming methods and the choice of portfolio weighting scheme in computing portfolio returns. Their study reconciles conflicting evidence of the accrual anomaly in Australia.

As mentioned above, prior Korean studies have shown mixed evidence on the accrual anomaly. In addition, no study has examined how research design choices affect hedge returns. Based on the four

[9] Na (2006) measures accruals by using the balance sheet approach. However, most accrual anomaly studies in Korea use the cash flow statement approach. For comparability purposes, we use the cash flow statement approach.

[10] The 1% of entire sample corresponds to the 1% of highest squared residuals of the least trimmed squares (LTS) regression of buy-and-hold size-adjusted returns on dummy variables indicating the accrual decile portfolio.

[11] Taylor and Wong (2012) use average total assets as the deflator for accruals.

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dimensions discussed by Taylor and Wong (2012), each prior study employs slightly different research specifications. The more commonly used research specification for each dimension is as follows. First, the cash flow statement (CFS) approach is used as a method for estimating accruals. Second, size-adjusted returns are used for computing abnormal returns. Notably, size-adjusted decile returns are equal-weighted, which is different from Sloan (1996) and other U.S. accrual anomaly studies.[12] Third, as for outlier treatments, many studies trim not only returns but also other variables such as accruals, size, and book-to-market (BM) at top and bottom 1%, which is a unique feature of the studies on the Korean accrual anomaly.[13] Fourth, accrual portfolio returns are equal-weighted, as in the U.S. studies. In addition, *annual* buy-and-hold returns are used for computing returns to the accruals hedge portfolio. We follow the aforementioned specifications as the initial benchmark for this study. The only difference between the aforementioned specifications and ours is that we refrain from trimming any variables in order to avoid any bias resulting from outlier treatments. In Section 5.2.2, we investigate the effects of outlier treatment for each variable. More importantly, building on the spirit of Taylor and Wong (2012), we test for the robustness of various research design choices.

2.2. Studies on the role of the deflator in capital markets-based accounting research

In the accounting literature, there has been a debate on what the proper deflator is in value relevance studies (Christie, 1987; Easton and Harris, 1991; Barth and Kallapur, 1996; Barth and Clinch, 2009). These studies run regressions of contemporaneous stock prices or market value of equity on accounting information such as earnings, where the regressions are commonly referred to as price specifications.[14] In these regressions, however, differences in firm size could lead to incorrect inferences, which are referred to as scale effects (Barth and Clinch, 2009). To address the issue of scale effects, prior studies suggest several alternative diagnostics.[15] One way is to deflate variables by a size proxy. Value relevance studies propose various size proxies as a deflator. For example, Easton (1998) use the beginning book value of equity, and Easton and Sommers (2003) use contemporaneous market value of equity. Rather than scaling by a size proxy, Barth and Kallapur (1996) propose an undeflated specification which includes a size proxy as an independent variable. However, Barth and Clinch (2009) examine several specifications of the Ohlson model (1995): equity market value-deflated, equity book value-deflated, and undeflated specifications. Through this analysis, they provide evidence that no single specification dominates the others for all five types of scale effects.

In contrast to value relevance studies, mispricing studies rarely look into the effect of deflators.[16] One exception is Hafzalla et al. (2011), who deflate accruals by the absolute value of earnings instead of total assets, being the first to define percent accruals. They show that hedge portfolios based on percent accruals outperform portfolios based on traditional accruals, thus documenting the importance of the deflator. By extending Hafzalla et al. (2011), we examine whether other size proxy deflators are as ineffective as total assets.

3. Traditional accruals versus percent accruals

We focus on operating accruals because most prior Korean accrual anomaly studies focus on operating accruals. There are two approaches to measure operating accruals: the balance sheet approach and the cash flow statement approach. Sloan (1996) uses the balance sheet approach to measure accruals. However, Collins and Hribar (2002) point out that there are significant measurement errors in measuring accruals from the balance sheet approach and suggest that accruals from the cash flow statement approach have

[12] We also use size-adjusted value-weighted returns to compute abnormal returns. Results are qualitatively similar.

[13] Later, we examine the impact of outliers for variables other than returns.

[14] A price specification is also called a 'level specification' or a 'price-level specification'. The regression of stock returns on accounting information is called a 'return specification', a 'change specification', or a 'return-change specification'.

[15] Barth and Clinch (2009) characterize five types of scale effects: multiplicative omitted scale factors, additive omitted scale factors, scale-varying coefficients, survivorship, and heteroscedasticity in the Ohlson (1995) model. Prior studies propose diagnostics to mitigate the five scale effects. However, using simulated data, Barth and Clinch (2009) find that diagnostics designed to address particular scale effects are generally ineffective. Thus, as an alternative to diagnostics for particular scale effects, they examine several specifications by changing deflators such as market value and book value, or by using an undeflated specification or a return specification.

[16] The mispricing test is more rigorous than the value relevance test in the sense that the mispricing test needs to show not only the association between future stock returns and accounting information but also the profitability of the given trading strategy where a hedge portfolio is constructed by sorting stocks by the accounting item of interest and by taking a long position in the undervalued extreme decile and a short position in the overvalued extreme decile.

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less measurement errors. Subsequent studies use accruals from the cash flows approach (Dechow and Ge, 2006; Hafzalla et al., 2011; Hirshleifer et al., 2011). Most prior studies on the accrual anomaly in Korea compute accruals in this manner, and we follow this approach as well.[17] Specifically, we compute accruals as the difference between earnings and cash flows from operations[18].

Most accounting and finance studies scale financial statement items. The most common scale variable in studies on the accrual anomaly is average total assets. As in Eq. (1), traditional accruals are defined as accruals scaled by average total assets. This measures the relative weight of accruals to total assets. Traditional accruals can be viewed as 'accruals returns on assets' (AROA), a component of 'returns on assets' (ROA).

$$\textit{Traditional Accruals} = (\textit{Earnings} - \textit{Cash Flows from Operations}) / \textit{Average Total Assets} \quad (1)$$

An alternative deflator for accruals is earnings. As mentioned above, earnings are a better deflator for testing for the earnings fixation hypothesis. However, the problem with earnings as a scale variable is that it can take on negative values.[19] To avoid this issue, Hafzalla et al. (2011) use the absolute value of earnings (i.e., unsigned earnings) instead of signed earnings. The benefit of using the absolute value of earnings as a deflator is that it sorts negative accruals into low accruals portfolios and positive accruals into high accruals portfolios. As in Eq. (2), percent accruals are defined as accruals divided by the absolute value of earnings.[20]

$$\textit{Percent Accruals} = (\textit{Earnings} - \textit{Cash Flows from Operations}) / |\textit{Earnings}| \quad (2)$$

Several reasons prompt us to focus on earnings rather than on total assets as the deflator. To begin with, unlike traditional accruals, percent accruals can prevent firms with both low accruals and low cash flows from being sorted into the lowest accrual decile. In general, low accruals are a good sign because we expect relatively higher cash flows in earnings (Sloan, 1996). However, firms with poor fundamentals tend to have both low accruals and low cash flows. If these firms are placed in the lowest decile due to low accruals, the lowest accrual decile will have poor performance. Percent accruals are defined in a way that, in the lowest decile, firms will have large negative accruals in the numerator and relatively small earnings in the denominator. As a result, firms in the lowest percent decile have large positive cash flows. In a similar vein, firms in the highest percent decile will have positive accruals and negative cash flows. Therefore, in these two extreme percent accrual deciles, firms will have accruals and cash flows that are of similar magnitude but have opposite signs.

In addition, percent accruals are not as sensitive to firm size as traditional accruals because firms are sorted on the ratio of accruals to earnings. As long as firms have the same proportion of accruals in earnings, they will be in the same decile regardless of their size. However, traditional accruals (or accruals deflated by any size proxy) emphasize only the magnitude of accruals because total assets fail to provide information about the proportion of accruals in earnings (the absolute value of net income). Even if two firms have the same level of accruals and cash flows, the two firms may end up in different accrual deciles due to the denominator (total assets). For example, when accruals are negative, smaller firms tend to be included in a lower decile. Thus, accruals deflated by total assets and other common size proxies (e.g. market value of equity, book value of equity, or sales) are expected to be sensitive to size, as well.[21]

Put together, we argue that percent accruals effectively select the lowest accruals firms and are not as sensitive to size as traditional accruals. Therefore, we expect the greatest difference between percent accruals and traditional accruals to be in the lowest accrual decile. With traditional accruals, poorly performing firms that have both negative accruals and negative cash flows are included in the lowest accrual decile. However, with percent accruals, firms with large positive cash flows are included in the lowest decile while poorly performing firms are scattered in the middle deciles. Thus, we expect that the lowest traditional accrual decile includes firms with small size and poor fundamentals while the lowest percent accrual decile does not. This

[17] We also measure accruals by using the balance sheet approach and find similar results.

[18] We use net income as earnings to compute accruals. Prior studies use either 'net income' or 'income before extraordinary items' (IBEI) to compute accruals. However, since 2007, firms in Korea are not allowed to report IBEI in the income statement.

[19] In footnote 15, Sloan (1996) also considers earnings as a deflator for implementing the accruals-based trading strategy but does not use it because the accruals-based trading strategy does not work when earnings are negative.

[20] Following Hafzalla et al. (2011), we assign the observations with zero net income to the lowest percent accrual decile or highest percent accrual decile depending on the sign of accruals.

[21] The empirical results of other size proxies are presented in Section 5.2.2.

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difference is likely to affect the performance of accruals-based trading strategies, as we discuss in more detail in the next section.

4. Sample and variables

Our sample consists of the firms listed on the KSE (Korea Stock Exchange) from the fiscal year of 1994 to 2010. We obtain financial statement data from the Total Solution 2000 (TS2000) database, provided by the Korea Listed Companies Association (KLCA). KLCA provides data from annual and quarterly reports for all firms listed in the KSE. Yields on Monetary Stabilization Bonds (MSB) with one-year maturity, which are the proxy for the risk-free rate, are from the Economic Statistics System (ECOS) (http://ecos.bok.or.kr/), maintained by the Bank of Korea. Stock returns and price data are obtained from Data Guide Pro. Following prior studies and ensuring that our trading strategy is implementable, we restrict our sample to firms with December fiscal year-end. We also exclude financial firms from our sample because their financing and operating activities are quite different from those of non-financial firms. Following Kraft et al. (2006), we do not require the subsequent year's earnings to exist in our sample. Thus, our sample does not suffer from a look-ahead bias.[22] All variables other than stock returns are winsorized at the top and bottom 1% levels each year. Our final sample consists of 9399 firm–year observations.

The main variables of this study are traditional accruals and percent accruals. As mentioned in Section 3, accruals are computed as earnings less cash flows from operating activities. Traditional accruals (*TACC*) are defined as accruals scaled by average total assets. Percent accruals (*PACC*) are defined as accruals scaled by the absolute value of earnings. We also compute both traditional cash flows (*TCASH*) and percent cash flows (*PCASH*) in a manner similar to the one we use for accruals.

We compute annual buy-and-hold size-adjusted returns by the difference between one-year-ahead raw stock returns and its corresponding size decile returns. One-year-ahead raw stock returns are computed as twelve month buy-and-hold returns, starting on the first day of April after the fiscal year-end. Size decile returns are computed as equal-weighted average stock returns of firms that belong to the same size decile, which is based on the market value of equity at the fiscal year-end.

Other variables are defined as follows. Return on assets (*ROA*) is defined as net income divided by average total assets. Price (*Price*) is the closing market price per share at the fiscal year-end. Market value of equity (*MVE*) is computed as the closing market price per share of a given firm times the number of outstanding common stocks as of the fiscal year-end. The book value of equity (*BVE*) is the book value owner's equity (in billion KRW) divided by average total assets. Assets (*Assets*) are the value of total assets (in billion KRW) at year *t*. Sales (*Sales*) are the sales (in billion KRW) during year *t*. Book-to-market (*BM*) is the ratio of total book value of common equities to the market value of equity at the fiscal year-end. Sales growth (*SG*) is annual sales growth at year t, computed as sales at year *t* divided by sales at year $t-1$ less 1. Loss (*Loss*) is a dummy variable, taking 1 if the net income for a specific firm–year is below zero, and 0 otherwise. Asset growth (*AG*) is computed as changes in total assets at year *t* divided by changes in total assets at year $t-1$. Earnings-to-price ratio (*E/P*) is defined as the bottom line net income per share divided by price per share at the fiscal year-end.

5. Empirical results

5.1. Descriptive statistics

Table 1 reports descriptive statistics for our main variables. The mean values of R_{t+1} and *Size-adj* R_{t+1} (14.09%, and 0.31%, respectively) are lower than the median values of R_{t+1} and *Size-adj* R_{t+1} (−0.15%, and −8.81%, respectively), and it implies that the stock returns are right-skewed, which is consistent with the prior studies (Hwang et al., 2005; Nam, 2009). The mean and median of earnings (*ROA*) are positive, which suggests that the average firm is profitable during our sample period. The mean traditional accruals

[22] Kraft et al. (2006) point out that Sloan (1996) excludes firms with next-period earnings information from his sample to examine time-series persistence of stock returns and accruals. They also show that when firms with next-period earnings information are included in the sample, most hedge returns come from the highest accrual decile, the short position which entails higher transaction costs than the long position.

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Table 1
Descriptive statistics.

Variable	N	Mean	Standard deviation	Q1	Median	Q3
R_{t+1}	9399	14.09%	90.48%	−30.44%	−0.15%	37.65%
Size-adj R_{t+1}	9399	0.31%	82.75%	−32.54%	−8.81%	19.09%
ROA_t	9399	0.009	0.134	0.003	0.024	0.060
$PACC_t$	9399	−0.802	6.564	−1.653	−0.518	0.571
$TACC_t$	9399	−0.031	0.128	−0.074	−0.023	0.026
$PCASH_t$	9399	1.343	6.578	−0.153	0.955	2.339
$TCASH_t$	9399	0.039	0.097	−0.009	0.043	0.094
$Price_t$	9399	22,223	52,870	3240	8600	20,500
MVE_t	9399	466	1693	21	52	170
BVE_t	9399	383	1087	34	85	241
$Assets_t$	9399	955	2537	87	199	583
$Sales_t$	9399	898	2583	72	169	501
B/M_t	9399	0.832	1.563	0.158	0.368	0.833
SG(%)	9399	12.18%	42.73%	−2.81%	8.04%	19.93%
Loss	9399	0.2306	0.4212	0.0000	0.0000	0.0000
AG(%)	9399	9.85%	26.04%	−2.65%	6.66%	17.60%
E/P_t	9399	−0.382	3.388	0.009	0.070	0.158

Table 1 reports basic descriptive statistics for our key variables. The total sample is 9399 firm–year observations for the period of 1994–2010. R is one-year-ahead raw stock returns, which are computed as twelve month buy-and-hold returns, starting on the first day of the fourth month after the fiscal year-end. Size-adj R is size-adjusted stock returns, which are the difference between one-year-ahead raw stock returns and its corresponding size decile returns. Size decile returns are computed as equal-weighted average stock returns of firms that belong to the same size decile, which is based on the market value of equity at the fiscal year-end. Return on assets (*ROA*) is defined as net income divided by average total assets. Price (*Price*) is the closing market price per share at the fiscal year-end. Market value of equity (*MVE*) is computed as the closing market price per share of a given firm times the number of outstanding common stocks as of the fiscal year-end. The book value of equity (*BVE*) is the book value owner's equity (in billion KRW) divided by average total assets. Assets (*Assets*) are the value of total assets (in billion KRW) at year *t*. Sales (*Sales*) are the sales (in billion KRW) during year *t*. Book-to-market (*BM*) is the ratio of total book value of common equities to the market value of equity at the fiscal year-end. Sales growth *(SG)* is annual sales growth at year t, computed as sales at year *t* divided by sales at year $t-1$ less 1. Loss (*Loss*) is a dummy variable, taking 1 if the net income for a specific firm–year is below zero, and 0 otherwise. Asset growth (*AG*) is computed as changes in total assets at year *t* divided by changes in total assets at year $t-1$. Earnings-to-price ratio (*E/P*) is defined as the bottom line net income per share divided by price per share at the fiscal year-end.

(*TACC*) and traditional cash flows (*TCASH*) are −0.031 and 0.039, respectively, implying that positive earnings (*ROA*) are driven by cash flows. Mean percent accruals (*PACC*) and percent cash flows (*PCASH*) have the same sign as traditional accruals and cash flows. In addition to the sign of each measure, percent accruals and percent cash flows contain information on the size of accruals and cash flows relative to earnings. The mean value (1.3) of percent cash flows (*PCASH*) indicates that cash flows are about 1.3 times as large as earnings, while the mean value (−0.8) of percent accruals (*PACC*) suggests that accruals are smaller than earnings. The mean and median of other variables are similar in magnitude to those of prior studies.

Table 2 reports the mean and median values of firm characteristics across traditional accrual deciles and percent accrual deciles. By comparing Panel A (B) with Panel C (D), the noticeable difference between the traditional accrual decile and the percent accrual decile is observed in the extreme deciles, especially in the lowest decile. First, the proportion of loss firms in the lowest traditional accrual decile (66.35%) is much higher than that in the lowest percent accrual decile (18.20%). Second, the mean and median values of *MVE*[23], *BVE*, *Assets*, and *Sales* of firms in the lowest traditional accrual decile are much smaller than those in the lowest percent accruals. Third, while firms in the lowest traditional accrual decile have poor performance with negative ROA, negative asset growth (*AG*), and low sales growth (*SG*), firms in the lowest percent accruals have sound performance with positive ROA, positive asset growth (*AG*), and high sales growth (*SG*). We conjecture that the difference in fundamentals between the firms included in the lowest traditional accrual decile and those in the lowest percent accrual decile leads to differences between stock returns for each decile. In contrast to the difference in the lowest accrual decile, firms in the highest accrual decile have sound fundamentals in terms of ROA, asset growth, and sales growth, for traditional accruals and percent accruals alike.

[23] Because the distribution of MVE for the lowest accrual decile for both types is right-skewed, we focus on the median rather than the mean. The median MVE of the lowest traditional accrual decile is much smaller than that of the lowest percent accrual decile.

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Table 2
Mean and median of various firms' characteristics across traditional accruals and percent accrual deciles.

TACC decile	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Panel A. Mean value of variables for traditional accrual deciles										
ROA_t	−0.197	−0.003	0.016	0.020	0.024	0.030	0.036	0.036	0.041	0.084
$PACC_t$	−3.858	−4.428	−3.654	−3.520	−2.415	−1.227	0.169	1.748	3.436	5.756
$TACC_t$	−0.271	−0.114	−0.076	−0.052	−0.033	−0.015	0.003	0.026	0.057	0.169
$PCASH_t$	3.528	4.733	4.146	4.101	3.058	1.903	0.581	−1.006	−2.691	−4.958
$TCASH_t$	0.071	0.110	0.092	0.073	0.058	0.046	0.032	0.010	−0.016	−0.083
$Price_t$	13,076	21,305	27,802	27,606	26,058	24,465	22,101	21,374	19,800	18,523
MVE_t	493	589	606	477	563	497	356	432	307	339
BVE_t	318	453	485	429	473	425	332	383	260	266
$Assets_t$	969	1206	1191	1077	1140	1010	764	886	643	665
$Sales_t$	866	1127	1188	1028	1086	910	734	793	582	659
B/M_t	1.919	0.978	0.731	0.753	0.660	0.645	0.634	0.598	0.635	0.782
$SG(\%)$	4.20%	14.14%	11.26%	12.16%	11.54%	8.54%	13.38%	12.33%	13.89%	20.36%
Loss	0.6635	0.3468	0.2537	0.2070	0.1789	0.1621	0.1250	0.1330	0.1316	0.1072
$AG(\%)$	−2.17%	6.09%	8.48%	7.85%	9.63%	9.76%	10.74%	13.38%	15.37%	19.34%
E/P_t	−3.683	−0.635	−0.174	−0.163	0.014	−0.032	0.091	0.093	0.100	0.542
Panel B. Median value of variables for traditional accrual deciles										
ROA_t	−0.136	0.015	0.024	0.019	0.025	0.026	0.028	0.031	0.034	0.052
$PACC_t$	−1.329	−2.030	−1.697	−1.543	−0.886	−0.357	0.077	0.591	1.239	2.150
$TACC_t$	−0.219	−0.105	−0.070	−0.048	−0.031	−0.013	0.004	0.026	0.059	0.132
$PCASH_t$	0.464	2.670	2.442	2.277	1.748	1.239	0.857	0.258	−0.537	−1.510
$TCASH_t$	0.076	0.115	0.095	0.070	0.057	0.044	0.028	0.008	−0.018	−0.078
$Price_t$	3090	7990	9900	9800	10,900	9525	8855	9200	9025	8360
MVE_t	25	51	57	61	63	59	56	57	53	48
BVE_t	28	82	98	111	99	91	102	94	81	69
$Assets_t$	127	210	219	250	214	204	211	202	176	170
$Sales_t$	125	197	208	214	185	168	173	167	145	145
B/M_t	0.758	0.385	0.336	0.365	0.323	0.336	0.348	0.325	0.329	0.379
$SG(\%)$	2.09%	8.81%	7.83%	8.06%	7.72%	6.53%	9.04%	8.31%	10.37%	10.90%
Loss	1.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
$AG(\%)$	−6.29%	3.90%	5.31%	4.88%	5.92%	6.21%	7.28%	8.83%	11.12%	15.43%
E/P_t	−0.414	0.047	0.068	0.065	0.071	0.081	0.082	0.085	0.098	0.132

PACC decile	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Panel C. Mean value of variables for percent accrual deciles										
ROA_t	0.007	0.010	−0.012	−0.052	−0.034	−0.011	0.035	0.052	0.075	0.019
$PACC_t$	−12.136	−3.424	−1.816	−1.144	−0.708	−0.334	0.105	0.680	1.731	9.012
$TACC_t$	−0.099	−0.090	−0.099	−0.115	−0.089	−0.056	−0.001	0.040	0.098	0.105
$PCASH_t$	12.763	3.986	2.168	1.330	1.007	0.753	0.556	0.080	−0.922	−8.275
$TCASH_t$	0.104	0.099	0.088	0.063	0.055	0.043	0.038	0.014	−0.024	−0.086
$Price_t$	14,902	19,377	20,451	24,363	33,085	28,005	27,024	23,710	19,891	11,299
MVE_t	408	513	446	491	770	624	421	450	350	184
BVE_t	454	476	402	368	499	421	316	354	309	228
$Assets_t$	1324	1206	1061	975	1160	945	679	744	720	741
$Sales_t$	1153	1170	1043	883	1110	935	656	665	663	700
B/M_t	0.843	0.721	0.812	1.092	1.139	1.029	0.589	0.557	0.748	0.793
$SG(\%)$	12.32%	11.73%	11.07%	8.61%	9.24%	10.29%	13.19%	14.49%	14.86%	15.99%
Loss	0.1820	0.2191	0.3241	0.4072	0.3507	0.2906	0.1695	0.1202	0.9560	0.1455
$AG(\%)$	7.26%	7.37%	5.84%	5.12%	6.55%	7.88%	13.59%	14.16%	15.30%	15.44%
E/P_t	0.039	0.005	−0.306	−0.970	−1.576	−1.375	−0.295	0.055	0.521	0.084
Panel D. Median value of variables for percent accrual deciles										
ROA_t	0.006	0.016	0.021	0.020	0.032	0.046	0.054	0.053	0.042	0.011
$PACC_t$	−8.890	−2.987	−1.617	−1.090	−0.697	−0.310	0.080	0.525	1.153	5.379
$TACC_t$	−0.083	−0.074	−0.073	−0.066	−0.042	−0.018	0.004	0.031	0.063	0.084
$PCASH_t$	9.677	3.744	2.286	1.722	1.402	1.127	0.820	0.385	−0.217	−4.711
$TCASH_t$	0.090	0.085	0.072	0.057	0.055	0.056	0.047	0.020	−0.010	−0.066
$Price_t$	7000	8445	9040	8000	8215	10,200	11,000	10,400	8970	6990
MVE_t	52	53	54	45	48	60	60	61	49	46
BVE_t	108	99	91	67	73	79	88	92	79	75

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Table 2 (*continued*)

PACC decile	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Panel D. Median value of variables for percent accrual deciles										
$Assets_t$	277	235	217	178	194	173	185	186	175	199
$Sales_t$	238	214	192	149	167	148	164	148	145	165
B/M_t	0.467	0.390	0.376	0.417	0.375	0.278	0.267	0.282	0.352	0.490
SG(%)	7.28%	7.64%	7.68%	5.88%	7.56%	7.01%	9.40%	10.23%	10.27%	8.30%
Loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AG(%)	2.43%	3.29%	3.45%	3.60%	5.33%	6.92%	9.69%	10.07%	10.76%	9.63%
E/P_t	0.031	0.060	0.059	0.046	0.067	0.087	0.110	0.121	0.114	0.046

Table 2 reports the mean of various firm characteristics across traditional accrual and percent accrual deciles. Panel A (Panel B) of Table 2 reports the mean (median) of various characteristics across traditional accrual deciles. Panel C (Panel D) of Table 2 reports the mean (median) of various characteristics across percent accrual deciles. Decile portfolios are formed annually by assigning firms into deciles based on the size of traditional (percent) accruals. All variables are defined in Table 1 below. *TACC* and *PACC* denote traditional accruals and percent accruals.

The first column of Table 3 shows the mean matching rate of the percent accrual decile with the traditional accrual decile. For each percent accrual decile, the remaining columns of Table 3 present the mean decile rank of traditional accruals, traditional cash flows, and the percent cash flows. The matching rate tends to be higher for the high percent accrual deciles than for the low percent accrual deciles. In line with Hafzalla et al. (2011), the lowest percent accrual decile has the second lowest matching rate (20.13%), which signifies that the performance of the percent accruals-based trading strategy could be quite different from that of the traditional accruals-based trading strategy and, in particular, the large difference between the two strategies is likely to come from the lowest accrual decile. Furthermore, the mean of the traditional accrual decile rank for firms in the lowest percent accruals is 2.882, which is much higher than 1. In contrast, the matching rate is over 50% only in the seventh and tenth percent accrual decile rank. These results and the findings in Table 2 reveal that the lowest percent accrual decile has much stronger fundamentals than the lowest traditional accrual decile, and that the future stock returns in the lowest traditional accrual decile are likely to be substantially lower than the future stock returns in the lowest percent accrual decile. Another interesting point can be made from the comparison of percent accrual decile with both types of cash flow deciles. Accruals generally have a negative relation with cash flows (Dechow, 1994). As the percent accruals rank increases, the mean values for both the traditional and percent cash flow decile rank decrease. The percent accrual decile rank, by construction, moves in tandem more consistently with the percent cash flow decile rank than with the traditional cash flow decile. For example, firms in *PACC1* (10) belong to *PCASH10* (1). On the other hand, firms in *PACC1* (10) belong to around *TCASH* 7 or 8 (1 or 2).

Table 3
Overlap between percent accruals, traditional accruals, traditional cash flows, and percent cash flows.

PACC decile	*PACC* matches *TACC*	*TACC* decile rank	*TCASH* decile rank	*PCASH* decile rank
1	20.13%	2.882	7.635	9.942
2	23.09%	3.123	7.480	8.604
3	22.53%	3.166	7.015	7.066
4	17.39%	3.274	6.234	6.019
5	27.72%	3.892	5.979	5.624
6	44.43%	5.109	5.836	5.189
7	57.10%	6.951	5.693	4.835
8	47.66%	8.294	4.513	3.952
9	35.39%	9.026	2.955	2.638
10	50.70%	9.292	1.660	1.141

The first column of Table 3 presents the mean matching rate of the percent accrual decile with the traditional accrual decile. The other columns of Table 3 report the mean decile rank of traditional accruals, traditional cash flows, and the percent cash flows corresponding to the decile rank of the percent accruals, respectively. *PACC* (*TACC*) denotes percent (traditional) accruals. *PCASH* (*TCASH*) denotes percent (traditional) cash flows.

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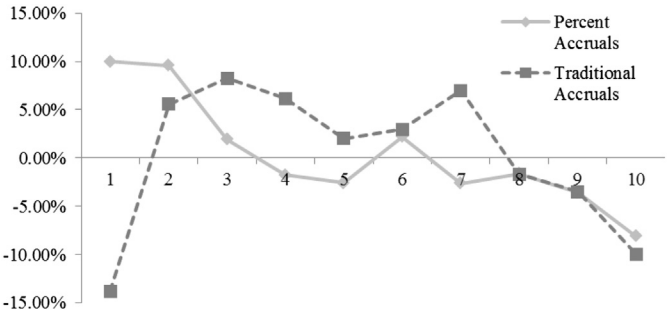

Fig. 1. Mean of annual size-adjusted returns across traditional accrual deciles and percent accrual deciles. Fig. 1 illustrates the mean of annual size-adjusted returns across traditional accrual decile portfolios and percent accrual decile portfolios during 1994–2010. Portfolios are annually formed by assigning firms into deciles based on the magnitude of traditional accruals (represented by the black dotted line) and percent accruals (represented by the gray solid line). Percent (traditional) accruals are defined as net income less cash flows from operations divided by the absolute value of net income (average total assets).

5.2. Hedge portfolio based on percent accruals versus hedge portfolio based on traditional accruals

In this section, we compare excess returns of the percent accruals-based hedge portfolio with that of the traditional accruals-based hedge portfolio and examine the robustness of the percent accruals-based hedge portfolio under various settings.

First, we examine the mean annual size-adjusted hedge returns for both type of accruals. For each accruals measure, we sort firms annually into deciles based on the magnitude of accruals and construct a hedge portfolio by taking a long position in the lowest decile and a short position in the highest decile. As can be seen from Fig. 1 and Table 4, the trading performance of the traditional accruals-based hedge portfolio and that of the percent accruals-based hedge portfolio show a sharp contrast. Fig. 1 shows that one-year-ahead size-adjusted returns across traditional accrual decile portfolios (represented by the dotted line in Fig. 1) tend to increase from the highest accrual decile (decile 10) portfolio to the second lowest accrual decile (decile 2) portfolio but suddenly drop in the lowest accrual decile (decile 1) portfolio. This pattern is consistent with Nam (2009). However, for percent accruals, one-year-ahead size-adjusted returns (represented by the solid line in Fig. 1) increase from the highest accrual decile (decile 10) to the lowest accrual decile (decile 1), which implies that the accrual anomaly seems to exist when percent accruals are used, but not when traditional accruals are used.

Table 4 confirms this conjecture. Panel A of Table 4 reports that the lowest traditional accrual decile returns are −13.79%, which is even lower than those of the highest traditional accrual decile (−9.99%). This is the lowest returns of all traditional accrual deciles. As a result, the traditional accruals-based hedge returns are insignificantly negative (−3.80%). This confirms a prior study that the accrual anomaly does not exist when traditional accruals are used to measure accruals. In contrast, Panel B of Table 4 shows that the mean returns of the lowest percent accrual decile are 9.99% while the mean returns of the highest percent accrual decile are −8.88%. Consequently, the percent accruals hedge returns are significantly positive (18.07%). This finding confirms our conjecture that the accrual anomaly exists when percent accruals are used to measure accruals.

In sum, the traditional accruals-based trading strategy does not yield any abnormal returns while the percent accruals-based strategy trading yields sizable abnormal returns. This result is driven by the long position in the lowest accrual decile. The difference in hedge returns shows that percent accruals have superior returns to traditional accruals. Another important point is that the magnitude of the returns to a long position (the lowest percent accrual decile) of the hedge portfolio is similar to that of a short position (the highest percent accrual decile). This finding is not only consistent with Hafzalla et al. (2011) but also suggests the percent accruals-based hedge portfolio is highly implementable because a long position entails much less transaction costs than a short position.

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Table 4
Size-adjusted stock returns for traditional accrual deciles and percent accrual deciles.

Panel A. Mean of one-year-ahead size-adjusted stock returns for traditional accrual deciles		
Traditional accrual decile	One-year-ahead size-adjusted stock returns	P-value
1 (Lowest)	−13.79%	0.008
2	5.58%	0.012
3	8.24%	0.002
4	6.16%	0.003
5	2.01%	0.076
6	2.98%	0.165
7	6.98%	0.182
8	−1.67%	0.543
9	−3.51%	0.083
10 (Highest)	−9.99%	0.001
Hedge portfolios (decile 1- decile 10)	−3.80%	0.360
Panel B. Mean of one-year-ahead size-adjusted stock returns for percent accrual deciles		
Percent accrual decile	One-year-ahead size-adjusted stock returns	P-value
1 (Lowest)	9.99%	0.001
2	9.55%	0.000
3	1.94%	0.281
4	−1.75%	0.362
5	−2.60%	0.305
6	2.19%	0.660
7	−2.63%	0.298
8	−1.65%	0.379
9	−3.61%	0.185
10 (Highest)	−8.08%	0.002
Hedge portfolios (decile 1–decile 10)	18.07%	<.001

P-values are based on two-tailed Fama–MacBeth t-statistics over 17 years.
Panel A (Panel B) of Table 4 reports time series mean of one-year-ahead size-adjusted stock returns for percent (traditional) accrual decile portfolios and percent (traditional) accruals-based hedge portfolios. One-year-ahead size-adjusted stock returns are the difference between one-year-ahead raw stock returns and its corresponding size decile returns. One-year-ahead raw stock returns are computed as twelve month buy-and-hold returns, starting on the first day of April after the fiscal year-end. Size decile returns are computed as equal-weighted average stock returns of firms that belong to the same size decile, which is based on the market value of equity at the fiscal year-end. The hedge portfolios are constructed by a long position in the lowest traditional (percent) accrual decile and a short position in the highest traditional (percent) accrual decile. Traditional (percent) accruals are defined as net income less cash flows divided by average total assets (the absolute value of net income).

Next, we assess whether the percent accruals-based trading strategy is robust after controlling for risk factors. Following Mashruwala et al. (2006), we estimate the following monthly CAPM and Fama–French three-factor time series regression for the extreme accrual deciles:

$$R_{i,t} - R_{f,t} = \alpha + \beta_1 \left(R_{m,t} - R_{f,t} \right) + \varepsilon_{i,t}$$
$$R_{i,t} - R_{f,t} = \alpha + \beta_1 \left(R_{m,t} - R_{f,t} \right) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t},$$

where $R_{i,t}$ is the monthly accrual decile portfolio returns. $R_{f,t}$ is the monthly risk-free rate, using the monthly annual yield on Monetary Stabilization Bonds (MSB) with 1-year maturity.[24] $R_{m,t}$ is the monthly value-weighted KSE market returns. SMB and HML are the monthly returns on size and book-to-market factor-mimicking portfolios, respectively (Fama and French, 1993). The intercept α (Jensen's alpha) is interpreted as the monthly abnormal returns of each extreme accrual decile after risk factors are controlled for. We test for whether α for each extreme accrual decile is significantly different from zero.

[24] Prior studies on the Korean asset pricing use MSB with 1 year as a risk-free rate (Kim et al., 2012).

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Table 5
The CAPM regressions and the Fama–French three-factor time-series regressions for monthly returns on traditional accrual deciles and percent accrual deciles (N = 204 monthly observations).

$R_{pt} - R_{ft} = \alpha + \beta(R_{mt} - R_{ft}) + \varepsilon_{pt}$

Portfolio	α	t(α)	β	t(β)	R^2
Panel A. The CAPM regressions (traditional accrual deciles)					
Traditional accrual decile 1	0.002	0.31	*0.873***	*11.14*	38.05%
Traditional accrual decile 2	0.012***	2.72	0.879***	18.70	63.38%
Traditional accrual decile 9	0.004	0.94	0.873***	17.49	60.24%
Traditional accrual decile 10	−0.002	−0.39	0.910***	17.65	60.65%
Hedge portfolios (decile 1–decile 10)	0.004	0.83	−0.037	−0.69	0.24%
Panel B. The CAPM regressions (percent accrual deciles)					
Percent accrual decile 1	0.013***	3.33	0.923***	21.67	69.92%
Percent accrual decile 2	0.012***	3.31	0.894***	23.09	72.53%
Percent accrual decile 9	0.006	1.16	0.888***	17.41	60.01%
Percent accrual decile 10	−0.002	−0.32	0.932***	17.50	60.26%
Hedge portfolios (decile 1–decile 10)	0.015***	4.58	−0.010	−0.28	0.04%

$R_{pt} - R_{ft} = \alpha + \beta_1(R_{mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{pt}$

Portfolio	α	t(α)	β_1	t(β)	β_2	t(β)	β_3	t(β)	R^2
Panel C. The Fama–French regressions (traditional accrual deciles)									
Traditional accrual decile 1	−0.004	−0.62	1.003***	15.67	0.85***	9.90	0.48***	5.78	61.58%
Traditional accrual decile 2	0.008**	2.47	0.966***	27.19	0.57***	11.91	0.32***	6.87	80.53%
Traditional accrual decile 9	0.000	0.03	0.973***	27.54	0.65***	13.69	0.35***	7.57	81.45%
Traditional accrual decile 10	−0.007**	−2.09	1.021***	30.01	0.71***	15.62	0.38***	8.43	84.09%
Hedge portfolios (decile 1–decile 10)	0.003	0.57	−0.018	−0.32	0.14*	1.87	0.11	1.51	2.83%
Panel D. The Fama–French regressions (percent accrual deciles)									
Percent accrual decile 1	0.009***	3.22	0.996***	32.99	0.51***	12.54	0.37***	9.42	85.92%
Percent accrual decile 2	0.009***	3.36	0.969***	34.82	0.49***	13.12	0.28***	7.75	86.80%
Percent accrual decile 9	0.001	0.43	0.996***	27.79	0.68***	14.24	0.32***	6.89	81.62%
Percent accrual decile 10	−0.007**	−2.15	1.040***	29.85	0.71***	15.29	0.44***	9.56	84.18%
Hedge portfolios (decile 1–decile 10)	0.016***	5.04	−0.044	−1.28	−0.21***	−4.51	−0.06	−1.43	9.70%

Panel A (Panel C) of Table 5 reports the CAPM (the Fama–French three-factor) regression of monthly returns for the extreme traditional accrual decile portfolio and their hedge returns, respectively. Panel B (Panel D) of Table 5 reports the CAPM (Fama–French three-factor) regression of monthly returns for the extreme percent accrual decile portfolio and their hedge, respectively. Traditional (percent) extreme accrual portfolio returns (R_{pt}) are the monthly raw buy-and-hold returns. Monthly returns for the traditional (percent) accrual hedge portfolios (R_{pt}) are computed as the monthly stock returns for the traditional (percent) accrual decile 10 less the monthly stock returns for the traditional (percent) accrual decile 1. R_{ft} is the risk free rate, which is the monthly annual yield on Monetary Stabilization Bonds (MSB) with 1-year maturity. R_{mt} is the value-weighted KSE market returns. SMB_t and HML_t are the returns to the Fama and French (1993) factor-mimicking portfolios for size and book-to-market, respectively. SMB_t and HML_t are the monthly returns for the factor-mimicking portfolios for size and book-to-market, respectively. These factors are constructed in the same way as Fama and French (1993). *, **, and *** denote significance at 10%, 5% and 1% levels respectively.

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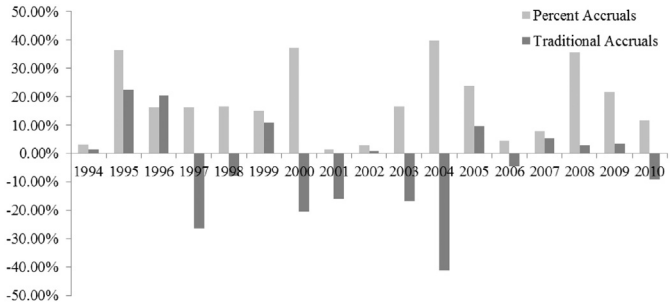

Fig. 2. Annual size-adjusted hedge returns for traditional accruals and percent accruals each year. Fig. 2 illustrates the annual size-adjusted hedge returns for traditional accruals and percent accruals each year. The gray line (the black line) represents returns on hedge portfolios based on percent accruals (traditional accruals). The sample period is 1994–2010. The hedge portfolios are constructed by a long position in the lowest percent (traditional) accruals portfolio and a short position in the highest percent (traditional) accruals portfolio.

Panel A and Panel B of Table 5 report the results of the CAPM regressions for traditional accrual deciles and percent accrual deciles. Consistent with Panel A of Table 4, Panel A of Table 5 shows that the traditional accruals-based hedge portfolio does not yield excess returns (α). Jensen's alpha (i.e., the regression coefficient α) for traditional accrual decile 1 (*TACC1*) is not statistically significant and it is lower than Jensen's alpha for traditional accrual decile 2 (*TACC2*). Panel B of Table 5 shows the results of the CAPM regression for percent accrual deciles. Unlike Panel A of Table 5, the percent accruals-based hedge portfolio yields positive abnormal returns (α) (1.5% per month, t-value = 4.58).

Panel C and Panel D of Table 5 report the monthly Fama–French three-factor time-series regressions for the traditional accruals and the percent accrual decile portfolios, respectively. The results for the monthly Fama–French three-factor time-series regressions are similar to results for the monthly CAPM regressions. Panel C of Table 5 shows that the traditional accruals-based hedge returns are insignificant (t-value = 0.57). However, Panel D of Table 5 shows that the percent accruals-based hedge returns are positively significant (1.6% per month, t-value = 5.04) even after the Fama–French risk factors are controlled for. Jensen's alpha for the percent accrual decile 1 (*PACC1*) is statistically significant and positive (0.9% per month, t-value = 3.22), and the Jensen's alpha for the percent accrual decile 10 (*PACC10*) is negatively significant (−0.7% per month, t-value = −2.15). In short, the results in Table 5 indicate that unlike the traditional accrual anomaly, the percent accrual anomaly exists in Korea even after risk factors are considered.

5.2.1. Time series stability of the trading strategy based on traditional accruals versus percent accruals

We examine whether the superior performance of the percent accruals-based hedge portfolios is driven by a few years of exceptional performance. Fig. 2 illustrates the annual size-adjusted hedge returns for traditional accruals and percent accruals each year. The results are quite surprising. For over 17 years, from 1994 through 2010, the percent accruals-based trading strategy never yields a loss. In contrast, the traditional accruals-based trading strategy yields profits for 8 out of 17 years. Furthermore, the percent accruals-based trading strategy delivers higher excess returns in 15 out of 17 years. One interesting point is that the traditional accruals-based trading strategy yields huge negative hedge returns (−26.33% and −7.73%, respectively) during the Asian financial crisis of 1997 and 1998, while the percent accruals-based strategy yields positive hedge returns (16.31% in 1997 and 16.55% in 1998, respectively) during this period. Overall, our findings indicate that the performance of the percent accruals-based trading strategy is not driven by chance and that it rather generates consistent and stable positive returns than the traditional accruals-based trading strategy.

5.2.2. Loss versus profit firms

Prior studies report that the accrual anomaly exists only for profit firms when traditional accruals are used (Dopuch et al., 2009; Nam, 2009). We investigate whether the accrual anomaly still exists only for profit firms when accruals are measured with percent accruals. To do so, we divide our sample into profit firms and loss firms and form accrual decile portfolios based on each type of accruals. Table 6 reports the mean of annual size-adjusted stock returns for profit firms and loss firms across each accrual decile and for hedge portfolios formed based on each type of accruals. Panel A shows that the traditional accruals-based trading strategy for

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Table 6
Size-adjusted stock returns for traditional accruals and percent accruals by profit firms and loss firms.

Panel A. Traditional accrual deciles						
Traditional accrual decile	Loss firms			Profit firms		
	Size-adj returns	t-value	%	Size-adj returns	t-value	%
1	−22.40%***	−4.42	6.59%	9.49%**	2.53	3.34%
2	−2.89%	−0.76	3.47%	10.12%***	4.65	6.53%
3	−3.64%	−0.8	2.54%	11.78%***	4.79	7.48%
4	3.01%	0.68	2.08%	7.16%***	4.38	7.94%
5	−4.05%	−0.93	1.79%	1.78%	1.3	8.21%
6	−4.66%	−0.88	1.63%	4.44%**	2.63	8.42%
7	35.29%	0.65	1.26%	4.39%*	1.77	8.78%
8	−9.46%	−1.03	1.33%	0.77%	0.32	8.66%
9	−12.04%	−1.51	1.32%	−2.07%	−1.2	8.71%
10	−30.58%***	−4.47	1.06%	−7.30%***	−3.06	8.87%
Hedge portfolios (D1–D10)	7.71%	1.11	23.06%	16.79%***	4.49	76.94%
Panel B. Percent accrual deciles						
Percent accrual decile	Loss firms			Profit firms		
	Size-adj returns	t-value	%	Size-adj returns	t-value	%
1	4.60%	0.69	1.81%	12.33%***	4.31	8.12%
2	10.93%*	1.96	2.19%	9.39%***	4.58	7.81%
3	−4.99%	−0.89	3.25%	3.52%	1.25	6.77%
4	−13.01%**	−2.65	4.09%	6.85%***	2.92	5.95%
5	−22.16%***	−4.02	3.50%	7.38%***	3.1	6.48%
6	12.02%	0.41	2.92%	3.38%	1.41	7.12%
7	−34.12%***	−5.22	1.70%	2.22%	0.81	8.34%
8	−21.09%**	−2.86	1.20%	1.60%	0.83	8.80%
9	−15.87%	−1.72	0.96%	−2.99%	−1.2	9.06%
10	−17.77%***	−5.5	1.45%	−6.32%**	−2.51	8.48%
Hedge portfolios (D1–D10)	24.68%***	3.63	23.06%	18.65%***	5.54	76.94%

P-values are based on two-tailed Fama–MacBeth t-statistics over 17 years.
Panel A (B) of Table 6 reports the one-year-ahead size-adjusted stock returns for loss firms and profit firms, respectively. Panel A (B) sorts firms by traditional (percent) accrual deciles. Loss (Profit) firms represent the firm with negative (positive) net income at year *t*. The percent (%) in the third (sixth) column is the ratio of loss (profit) firms to the total sample.

profit firms yields significant positive size-adjusted returns while the traditional accruals-based trading strategy for loss firms yields insignificant returns. This is consistent with the results of prior studies (Dopuch et al., 2009; Nam, 2009). However, Panel B shows that the percent accruals-based trading strategy yields significant positive returns for loss firms as well as profit firms. Moreover, percent accruals-based hedge returns for loss firms (24.68%) are even higher than the returns for profit firms (18.65%). It is noted that for loss firms, most of the abnormal returns come from the short position. In contrast, for profit firms, abnormal returns come more from a long position than from a short position. In sum, when percent accruals are used to measure accruals, the accrual anomaly is robust to whether sample firms consist of profit firms or loss firms.

5.2.3. Arbitrage risk

Mashruwala et al. (2006) show that the accrual anomaly is concentrated in firms with high idiosyncratic stock returns volatility, a proxy for the high arbitrage risk. They suggest that the high idiosyncratic volatility of stock returns prevents investors from exploiting the arbitrage opportunity of the accrual anomaly. Following Mashruwala et al. (2006), we compute arbitrage risk as the residual variance from a regression model of each firm's stock returns on the value-weighted KSE market returns for up to 48 months before the month of portfolio formation. To investigate the link between arbitrage risk and accruals, we form five quintile portfolios based on idiosyncratic volatility for traditional and percent accruals respectively and examine the accruals hedge returns of each quintile of idiosyncratic volatility of stock returns.[25]

[25] For this analysis, accruals-based hedge portfolios are based on quintile portfolios (Mashruwala et al., 2006; Hafzalla et al., 2011).

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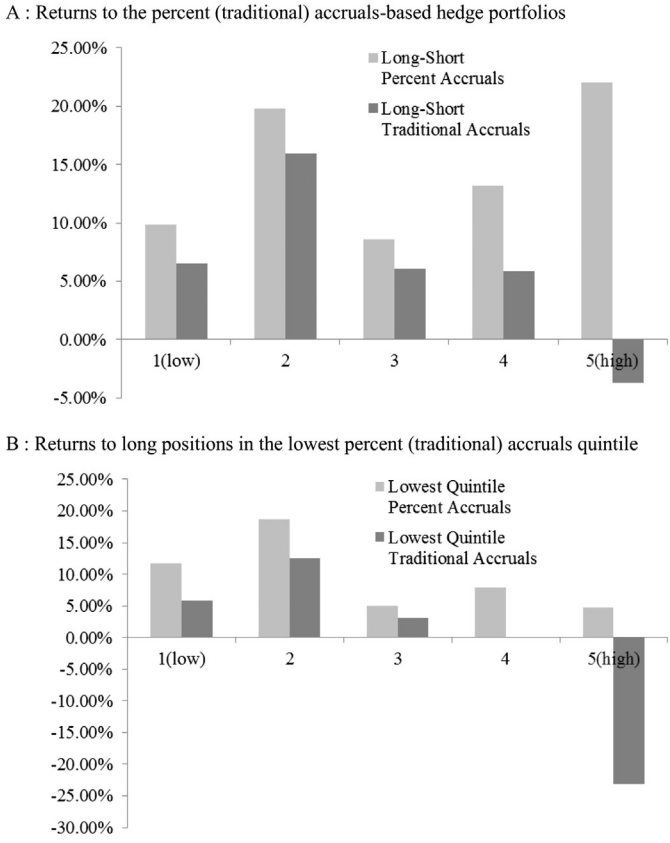

Fig. 3. Mean of annual size-adjusted returns for traditional accruals and percent accruals by arbitrage risk quintile. Panel A: Returns to the percent (traditional) accruals-based hedge portfolios. Panel B: Returns to long positions in the lowest percent (traditional) accrual quintile Fig. 3 illustrates the mean of annual size-adjusted returns for percent accruals and traditional accruals portfolios by arbitrage risk quintile. Volatility is the residual variance from a regression model of each firm's stock returns on the value-weighted KSE market returns for up to 48 months before the month of portfolio formation. The number in x-axis indicates the nth quintile of arbitrage risk. For each arbitrage risk quintile, the hedge portfolios are constructed by a long position in the lowest percent (traditional) quintile accrual portfolio and a short position in the highest percent (traditional) quintile accrual portfolio.

Fig. 3 illustrates the mean annual size-adjusted returns for the percent accruals portfolios and the traditional accruals portfolios by quintile of volatility as a proxy for arbitrage risk. Panel A of Fig. 3 shows that the percent accruals hedge returns are larger than the traditional accruals hedge returns across all arbitrage risk quintiles. In addition, the hedge returns of percent accruals in the highest arbitrage risk quintile are largest among all arbitrage risk quintiles. Interestingly, the traditional accruals hedge portfolio in the highest arbitrage risk quintile delivers the lowest negative returns among the quintile portfolios. The highest arbitrage risk quintile is expected to yield the highest returns when the accrual anomaly exists (Mashruwala et al., 2006). We conjecture that the extremely low returns in the highest arbitrage risk quintile result from a set of firms in the lowest traditional accrual decile, which hinders the accrual anomaly.

Panel B of Fig. 3 illustrates the size-adjusted returns of the long position of the percent accruals hedge portfolio and the traditional accruals hedge portfolio across arbitrage risk quintiles. As in Panel A, percent accruals outperform traditional accruals. The traditional accruals hedge returns in the highest arbitrate risk quintile are negative, contrary to the U.S. samples. Again, this finding is likely to result from a set of firms in the lowest traditional accrual decile. In summary, Fig. 3 illustrates that both the hedge portfolio returns and the long position returns are higher for percent accruals than traditional accruals across all arbitrage risk quintiles. This suggests that arbitrage risk does not fully explain abnormal returns to the percent accruals-based hedge portfolio, although this risk somewhat affects the trading performance of the percent accruals-based portfolio.

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Table 7
Distribution by accrual decile and cash flow decile.

Panel A. Traditional accruals vs. traditional cash flows

Traditional cash flow decile	Traditional accrual decile										Total
	1 (Lowest)	2	3	4	5	6	7	8	9	10 (Highest)	
1 (Lowest)	**162**	22	20	18	22	22	20	46	**108**	**493**	933
	1.72%	0.23%	0.21%	0.19%	0.23%	0.23%	0.21%	0.49%	**1.15%**	**5.25%**	
2	78	45	33	26	36	36	52	**120**	**321**	**193**	940
	0.83%	0.48%	0.35%	0.28%	0.38%	0.38%	0.55%	**1.28%**	**3.42%**	**2.05%**	
3	68	42	24	38	38	80	**128**	**247**	**190**	**87**	942
	0.72%	0.45%	0.26%	0.40%	0.40%	0.85%	**1.36%**	**2.63%**	**2.02%**	0.93%	
4	44	41	38	43	66	**108**	**221**	**206**	**123**	52	942
	0.47%	0.44%	0.40%	0.46%	0.70%	**1.15%**	**2.35%**	**2.19%**	**1.31%**	0.55%	
5	41	39	50	65	**121**	**198**	**200**	**123**	**67**	35	939
	0.44%	0.41%	0.53%	0.69%	**1.29%**	**2.11%**	**2.13%**	**1.31%**	0.71%	0.37%	
6	41	49	59	**137**	**194**	**199**	**112**	**73**	54	26	944
	0.44%	0.52%	0.63%	**1.46%**	**2.06%**	**2.12%**	**1.19%**	0.78%	0.57%	0.28%	
7	41	50	**110**	**239**	**196**	**122**	**80**	54	39	13	944
	0.44%	0.53%	**1.17%**	**2.54%**	**2.09%**	**1.30%**	0.85%	0.57%	0.41%	0.14%	
8	37	**106**	**216**	**189**	**160**	92	61	37	21	21	940
	0.39%	**1.13%**	**2.30%**	**2.01%**	**1.70%**	0.98%	0.65%	0.39%	0.22%	0.22%	
9	70	**258**	**266**	**122**	72	59	55	22	12	6	942
	0.74%	**2.74%**	**2.83%**	**1.30%**	0.77%	0.63%	0.59%	0.23%	0.13%	0.06%	
10 (Highest)	**351**	**288**	**126**	65	34	28	15	12	7	7	933
	3.73%	**3.06%**	**1.34%**	0.69%	0.36%	0.30%	0.16%	0.13%	0.07%	0.07%	
Total	933	940	942	942	939	944	944	940	942	933	9399

Panel B. Percent accruals vs. percent cash flows

Percent cash flow decile	Percent accrual decile										Total
	1 (Lowest)	2	3	4	5	6	7	8	9	10 (Highest)	
1 (Lowest)	0	0	0	0	0	1	27	43	61	**803**	935
	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.29%	0.46%	0.65%	**8.54%**	
2	0	0	2	61	**102**	**140**	64	68	**371**	**132**	940
	0.00%	0.00%	0.02%	0.65%	**1.09%**	**1.49%**	0.68%	0.72%	**3.95%**	**1.40%**	
3	0	0	68	**138**	**113**	91	69	91	**371**	0	941
	0.00%	0.00%	0.72%	**1.47%**	**1.20%**	0.97%	0.73%	0.97%	**3.95%**	0.00%	
4	0	13	85	93	**98**	42	29	**459**	**124**	0	943
	0.00%	0.14%	0.90%	0.99%	**1.04%**	0.45%	0.31%	**4.88%**	**1.32%**	0.00%	
5	0	26	80	79	16	16	**460**	**247**	14	0	938
	0.00%	0.28%	0.85%	0.84%	0.17%	0.17%	**4.89%**	**2.63%**	0.15%	0.00%	
6	0	39	52	13	48	**480**	279	32	0	0	943
	0.00%	0.41%	0.55%	0.14%	0.51%	**5.11%**	2.97%	0.34%	0.00%	0.00%	
7	0	42	17	**180**	**516**	**173**	16	0	0	0	944
	0.00%	0.45%	0.18%	**1.92%**	**5.49%**	**1.84%**	0.17%	0.00%	0.00%	0.00%	
8	6	50	**463**	376	45	0	0	0	0	0	940
	0.06%	0.53%	**4.93%**	4.00%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	
9	42	**722**	**174**	3	0	0	0	0	0	0	941
	0.45%	**7.68%**	**1.85%**	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
10 (Highest)	**886**	48	0	0	0	0	0	0	0	0	934
	9.43%	0.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Total	934	940	941	943	938	943	944	940	941	935	9399

Cells with proportion (bottom number) > 1% are highlighted with bold numbers.
Panel A (Panel B) of Table 7 illustrates the distribution of firms across traditional (percent) accrual deciles and traditional (percent) cash flow deciles. The upper number in each cell indicates the number of firms in each cell. The lower number in each cell indicates the proportion of the firm years in each cell to the total firm year observations.

5.3. Reasons for the low returns of the lowest traditional accruals

In the previous section, we saw that the lowest traditional accrual decile has poor fundamentals and low stock returns. However, one does not know which stocks in the lowest traditional accruals deter the accrual

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anomaly. In this section, we attempt to identify firms that drive the extremely low stock returns in the lowest traditional accrual decile.

To answer why the lowest traditional accrual decile has substantially low returns, we pay special attention to cash flows. It is well documented that accruals are negatively correlated with cash flows (Dechow, 1994). However, the negative correlation between accruals and cash flows varies across traditional accrual deciles. As mentioned in the previous section, firms in the lowest traditional accrual decile are reducing assets and exiting their businesses. In contrast to other deciles, a significant portion of the lowest decile includes firms with huge negative cash flows alongside firms with positive cash flows (Kraft et al., 2004; Kraft et al., 2006). In other words, there is a set of firms with a positive correlation between accruals and cash flows in the lowest traditional accrual decile. Because these firms have highly negative earnings (consisting of huge negative traditional accruals and negative traditional cash flows), the firms tend to have poor fundamentals and operating performance. Therefore, we conjecture that the firms with both highly negative accruals and cash flows are the main reason that the stocks in the lowest traditional accrual decile have much more negative returns than the stocks in the highest traditional accrual decile in the Korean stock market.

To examine whether how cash flows of the firms in the lowest traditional accrual decile behave differently from the cash flows in other traditional accrual deciles, we sort firms separately based on traditional accruals and traditional cash flows. Panel A (Panel B) of Table 7 illustrates the distribution of firms across the traditional (percent) accrual decile and traditional (percent) cash flow decile. All cells exceeding the expected 1% of total observations are highlighted in bold. Due to the negative relation between accruals and cash flows, we would expect observations to be concentrated in the main diagonal cells and fewer observations to exist in the off-diagonal ones (Dechow, 1994). As expected, observations in the main diagonals are highly concentrated in both Panel A and Panel B of Table 7. However, the extent of concentration in the main diagonals is stronger for percent accruals than for traditional accruals. This result is expected due to the construction of percent accruals and percent cash flows. Surprisingly, in contrast to percent accruals (Panel B), traditional accruals (Panel A) have a disproportionately large number of firms found simultaneously in the lowest traditional accrual decile and the lowest traditional cash flow decile (*TACC1 ∗ TCASH1,* henceforth) while there is still a concentration of observations in the main diagonals and an absence of observations in the off-diagonals. These firms consist of 162 observations and have highly negative traditional accruals, highly negative

Table 8
Mean of various fundamentals for stocks belonging to the lowest traditional accruals and/or the lowest traditional cash flow deciles and mean of their difference.

Variables	*TACC1* (1)	*TACC1 ∗ TCASH1* (2)	*TACC1/TCASH1* (3)	Difference (4) = (2) − (3)
N	933	162	771	
Size-adj R_{t+1}	−13.79%	−45.62%	−6.46%	−39.16%***
ROA_t	−0.197	−0.525	−0.128	−0.396***
$PACC_t$	−3.858	−0.672	−4.528	3.856***
$TACC_t$	−0.271	−0.375	−0.249	−0.126***
$PCASH_t$	3.528	−0.328	4.338	−4.666***
$TCASH_t$	0.071	−0.17	0.121	−0.291***
$Price_t$	13,076	2626	15,272	−12,646***
MVE_t	493	44	587	−544***
BVE_t	313	−137	408	−545***
Assets	969	310	1107	−798***
$Sales_t$	866	278	989	−711***
B/M_t	1.919	2.432	1.811	0.621***
SG(%)	4.20%	−10.58%	7.31%	−17.89%***
Loss	0.6635	1.0000	0.5927	0.4073***
AG(%)	−0.022	−0.17	0.009	−0.179***
Negative BVE (%)	21.33%	35.80%	18.29%	17.51%***

Table 8 reports the difference in various fundamentals between stocks belonging to the lowest traditional accruals and/or traditional cash flow deciles. *TACC1* (1) denotes the firms belonging to the traditional accrual decile 1. *TACC1 ∗ TCASH1* (2) denotes the firms belonging to both the traditional accrual decile 1 and the traditional cash flow decile 1. *TACC1* without *TCASH1* (3) denotes the firms belonging to the traditional accrual decile 1 after excluding firms in the traditional cash flow decile1 from *TACC1*. Difference (4) indicates the difference in various firms' characteristics between firms in *TACC1 ∗ TCASH1* (2) and *TACC1/TCASH1* (3). All variables are defined in Table 1. Statistical significance in the last column of Table 8 is based on the Wilcoxon test statistics. *, **, and ***: denote significance at the 0.1, 0.05, and 0.01 levels, respectively.

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traditional cash flows, and the smallest earnings (i.e., the most negative earnings). These firms are likely to have poor fundamentals and eventually experience low stock returns because of declining investor interest. Taken together, firms in *TACC1 * TCASH1* are likely to be the reason that previous studies using traditional accruals fail to find evidence of the accrual anomaly.

To confirm our conjecture, we focus on traditional accrual decile 1 (*TACC1*) and partition the firms in *TACC1* into either the lowest traditional cash flow decile (*TACC1 * TCASH1*) or the other traditional cash flow deciles (i.e., traditional cash flow deciles 2 ~ 10; *TACC1/TCASH1*, henceforth). Table 8 reports the stock returns and fundamentals for firms belonging to *TACC1*, *TACC1 * TCASH1*, *TACC1/TCASH1*, and the differences between the characteristics of firms in *TACC1 * TCASH1* and those in *TACC1/TCASH1*. First, we examine stock returns for each group. Firms in *TACC1 * TCASH1* have extremely negative annual size-adjusted stock returns (−45.62%) while firms in *TACC1/TCASH1* have much smaller negative annual size-adjusted returns (−6.46%) This finding suggests that the firms in *TACC1 * TCASH1* are likely to be the main reason for the large negative future stock returns of the lowest traditional accrual decile portfolio *(TACC1),* as reported in Panel A of Table 4. An examination of the magnitude of stock returns suggests that firms in *TACC1 * TCASH1* could have different fundamentals from the firms in *TACC1/TCASH1*.

Firms in *TACC1 * TCASH1* have much worse fundamentals than the firms in *TACC1/TCASH1*. More importantly, firms in *TACC1 * TCASH1* by construction have huge negative traditional cash flows (−0.17), whereas

Table 9
Size-adjusted stock returns for re-constructed traditional accrual deciles and percent accruals.

Panel A. Mean of one-year-ahead size-adjusted stock returns for re-constructed traditional accrual decile portfolios

Re-constructed traditional accrual decile	One-year-ahead size-adjusted stock returns	P-value
1 (Lowest)	−2.97%	0.419
2	4.80%	0.037
3	8.93%	0.000
4	4.49%	0.021
5	2.26%	0.080
6	3.02%	0.097
7	7.46%	0.163
8	−1.80%	0.498
9	−3.90%	0.057
10 (Highest)	−9.95%	0.001
Hedge portfolios (decile 1–decile 10)	6.98%	0.034

Panel B. Mean of one-year-ahead size-adjusted stock returns for re-constructed percent accrual decile portfolios

Re-constructed percent accrual decile	One-year-ahead size-adjusted stock returns	P-value
1 (Lowest)	9.94%	0.001
2	10.19%	0.000
3	1.65%	0.371
4	2.52%	0.209
5	−0.71%	0.725
6	3.77%	0.482
7	−1.56%	0.557
8	−1.44%	0.424
9	−3.19%	0.250
10 (Highest)	−8.61%	0.001
Hedge portfolios (decile 1–decile 10)	18.55%	<.001

P-values are based on two-tailed Fama–MacBeth t-statistics over 17 years.
Panel A (Panel B) of Table 9 reports the time-series mean of one-year-ahead size-adjusted stock returns for percent (traditional) accrual decile portfolios and percent (traditional) accruals-based hedge portfolios, after the 162 firm–years that belong to the lowest traditional accrual decile and the lowest traditional cash flow decile are excluded from the full sample (9399). The number of observations in the sample used in Table 9 is 9237 (firm–years). One-year-ahead size-adjusted stock returns are the difference between one-year-ahead raw stock returns and its corresponding size decile returns. One-year-ahead raw stock returns are computed as twelve month buy-and-hold returns, starting on the first day of April after the fiscal year-end. Size decile returns are computed as equal-weighted average stock returns of firms that belong to the same size decile, which is based on the market value of equity at the fiscal year-end. The hedge portfolios are constructed by a long position in the lowest traditional (percent) accruals portfolio and a short position in the highest traditional (percent) accruals portfolio. Traditional (percent) accruals are defined as net income less cash flows divided by average total assets (the absolute value of net income).

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Table 10
The CAPM regressions and the Fama–French three-factor time-series regressions for monthly returns on re-constructed traditional accrual deciles and percent accrual deciles (N = 204 monthly observations).

Panel A. The CAPM regressions (re-constructed traditional accrual deciles)

$R_{pt} - R_{ft} = \alpha + \beta(R_{mt} - R_{ft}) + \varepsilon_{pt}$

Portfolio	α	t(α)	B	t(β)	R^2
Traditional accrual decile 1	0.013*	1.97	0.88***	13.05	45.74%
Traditional accrual decile 2	0.012***	2.79	0.89***	19.20	64.61%
Traditional accrual decile 9	0.004	0.91	0.88***	17.48	60.20%
Traditional accrual decile 10	−0.001	−0.18	0.92***	17.86	61.23%
Hedge portfolios (decile 1–decile 10)	0.013***	3.24	−0.04	−0.87	0.37%

Panel B. The Fama–French regressions (re-constructed traditional accrual deciles)

$R_{pt} - R_{ft} = \alpha + \beta_1(R_{mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{pt}$

Portfolio	α	t(α)	β_1	t(β)	β_2	t(β)	β_3	t(β)	R^2
Traditional accrual decile 1	0.004	0.79	0.991***	18.29	0.75***	10.27	0.44***	6.21	67.39%
Traditional accrual decile 2	0.008**	2.33	0.968***	27.74	0.56***	11.93	0.32***	7.07	81.13%
Traditional accrual decile 9	0.000	0.04	0.979***	27.79	0.65***	13.85	0.35***	7.61	81.72%
Traditional accrual decile 10	−0.006**	−2.03	1.022***	29.75	0.71***	15.46	0.37***	8.29	83.83%
Hedge portfolios (decile 1–decile 10)	0.010**	2.44	−0.031	−0.66	0.03	0.56	0.07	1.12	1.01%

Panel C. The CAPM regressions (re-constructed percent accrual deciles)

$R_{pt} - R_{ft} = \alpha + \beta(R_{mt} - R_{ft}) + \varepsilon_{pt}$

Portfolio	α	t(α)	B	t(β)	R^2
Percent accrual decile 1	0.013***	3.34	0.922***	21.62	69.82%
Percent accrual decile 2	0.013***	3.42	0.896***	22.91	72.21%
Percent accrual decile 9	0.006	1.23	0.891***	17.64	60.63%
Percent accrual decile 10	−0.002	−0.40	0.934***	17.31	59.74%
Hedge portfolios (decile 1–decile 10)	0.015***	4.72	−0.011	−0.32	0.05%

Panel D. The Fama–French regressions (re-constructed percent accrual deciles)

$R_{pt} - R_{ft} = \alpha + \beta_1(R_{mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{pt}$

Portfolio	α	t(α)	β_1	t(β)	β_2	t(β)	β_3	t(β)	R^2
Percent accrual decile 1	0.009***	3.23	0.996***	32.96	0.509***	12.55	0.375***	9.48	85.91%
Percent accrual decile 2	0.009***	3.51	0.972***	34.35	0.494***	13.02	0.278***	7.51	86.47%
Percent accrual decile 9	0.002	0.57	0.998***	27.92	0.678***	14.13	0.308***	6.57	81.63%
Percent accrual decile 10	−0.007**	−2.30	1.042***	29.66	0.722***	15.32	0.448***	9.73	84.09%
Hedge portfolios (decile 1–decile 10)	0.016***	5.23	−0.046	−1.35	−0.214***	−4.66	−0.073	−1.63	10.45%

Panel A (Panel B) of Table 10 reports the CAPM (Fama–French three-factor) regression of monthly returns for the extreme traditional accrual decile portfolio and their hedge returns, respectively, after firms in the traditional accrual decile 1 and traditional cash flow decile 1 are excluded from the sample. Panel C (Panel D) of Table 10 reports the CAPM (Fama–French three-factor) regression of monthly returns for the extreme percent accrual decile portfolio and their hedge returns, respectively, after firms in traditional accrual decile 1 and traditional cash flow decile 1 are excluded from the full sample. Traditional (percent) extreme accruals portfolios returns (R_{pt}) are the monthly raw buy-and-hold returns. Monthly returns for the traditional (percent) accruals hedge portfolios (R_{pt}) are computed as the monthly stock returns for the traditional (percent) accrual decile 10 less the monthly stock returns for the traditional (percent) accrual decile 1. R_{ft} is the risk free rate, which is the monthly annual yield on Monetary Stabilization Bonds (MSB) with 1-year maturity. R_{mt} is the value-weighted KSE market returns. SMB_t and HML_t are the returns to the Fama and French (1993) factor-mimicking portfolios for size and book-to-market, respectively. SMB_t and HML_t are the monthly returns for the factor-mimicking portfolios for size and book-to-market, respectively. These factors are constructed in the same way as Fama and French (1993). *, **, and *** denote significance at 10%, 5% and 1% level respectively.

firms in *TACC1/TCASH1* have positive traditional cash flows (0.121). In addition, firms in *TACC1* ∗ *TCASH1* have much worse ROA (−0.525), lower sales growth (−10.58%), and smaller book value of equity (−137 billion KRW) than firms in *TACC1/TCASH1*. The firms in *TACC1* ∗ *TCASH1* are 100% loss firms and have low-priced

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stocks (2626 KRW). The last column of Table 8 presents evidence that, regarding several fundamentals and stock returns, there are significant differences between firms in *TACC1 * TCASH1* and *TACC1/TCASH1*. One interesting observation is that the mean value of percent accruals is much larger for firms in *TACC1 * TCASH1* (−0.672) than for firms in *TACC1/TCASH1* (−4.528), indicating that using percent accruals places firms with extremely poor fundamental into the middle percent accrual deciles. Because of this feature of percent accruals, the stock returns of percent accrual decile 1 (*PACC1*) are higher than those of traditional accrual decile 1 (*TACC1*). Overall, firms in *TACC1 * TCASH1* have poorer fundamentals and extremely lower stock returns than the firms in *TACC1/TCASH1*. Firms in *TACC1 * TCASH1* appear to be a main contributing factor to the inability of prior studies to document the existence of the accrual anomaly.

To examine whether the firms in *TACC1 * TCASH1* are the primary reason for the low returns for the lowest traditional accrual decile, we re-construct the traditional accruals portfolios after excluding these firms from the sample. Panel A of Table 9 shows annual size-adjusted stock returns of the re-constructed traditional accrual deciles. For comparison, Panel B of Table 9 reports annual size-adjusted stock returns of percent accrual deciles re-constructed with the sample in Panel A of Table 9. The returns of the re-constructed traditional accruals-based strategy become significant and positive (6.98%). In addition, the returns to the percent accruals-based strategy become larger than the hedge portfolio returns in Panel B of Table 4. One interesting point is that the size-adjusted returns in the lowest percent accrual decile do not differ from the corresponding returns in Panel B of Table 4. However, the size-adjusted returns in the lowest traditional accrual decile increase by almost 11%, from the corresponding returns in Panel A of Table 4. We acknowledge that the stock returns in the lowest traditional accrual decile are still negative and lower than the returns in the low other traditional accrual deciles (decile2 ~ decile7). Overall, Panels A and B of Table 9 confirm that the firms in *TACC1 * TCASH1* are likely to be the reason that previous studies using traditional accruals fail to find evidence of the accrual anomaly.

We also conduct the CAPM regressions and the Fama–French three-factor time-series regressions for the re-constructed traditional (percent) accrual decile portfolios. Specifically, Panel A of Table 10 reports the

Table 11
Size-adjusted stock returns for alternative size proxy-deflated accrual deciles.

Accrual decile	MVE-deflated accruals	BVE-deflated accruals	Sales-deflated accruals
1 (Lowest)	−7.68%	−12.87%	−15.21%
	(0.031)	(0.002)	(0.001)
2	4.66%	3.40%	4.85%
	(0.073)	(0.138)	(0.066)
3	8.46%	11.14%	5.69%
	(0.003)	(<0.001)	(0.018)
4	6.66%	10.43%	8.71%
	(0.013)	(0.000)	(0.001)
5	2.80%	2.40%	4.69%
	(0.171)	(0.213)	(0.050)
6	−0.69%	0.64%	0.80%
	(0.699)	(0.726)	(0.673)
7	2.38%	5.91%	9.00%
	(0.631)	(0.297)	(0.065)
8	−2.53%	−1.15%	−1.45%
	(0.212)	(0.627)	(0.619)
9	−6.23%	−4.73%	−3.68%
	(0.018)	(0.034)	(0.114)
10(Highest)	−5.03%	−12.22%	−10.42%
	(0.051)	(0.003)	(0.001)
Hedge portfolios (decile 1-decile 10)	−2.65%	−0.65%	−4.79%
	(0.390)	(0.886)	(0.242)

P-values are in the parenthesis, based on two-tailed Fama–MacBeth t-statistics over 17 years.
Table 11 reports the time-series mean of one-year-ahead size-adjusted stock returns for alternative size proxies-deflated accrual deciles. MVE-deflated accruals are defined as the accruals scaled by market value of equity. BVE-deflated accruals are defined as the accruals scaled by book value of equity. Sales-deflated accruals are defined as the accruals scaled by sales. Portfolio formations and returns accumulation are the same as in Table 4.

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results of the monthly CAPM regressions using the re-constructed sample as in Table 9. In contrast to the results of Table 5, Panel A of Table 10 shows that Jensen's alpha for the lowest re-constructed traditional accrual decile (*TACC1*) is significantly positive (1.3% per month, t-value = 3.24). Consistent with the results of Panel A of Table 9, Panel A of Table 10 also supports our argument that the firms in *TACC1* ∗ *TCASH1* are likely to be the reason that previous studies using traditional accruals fail to find evidence of the accrual anomaly. Panel B of Table 10 shows the results of the monthly Fama–French three-factor time-series regressions using the same re-constructed sample in Panel A. The results in Panel B indicate that while the Jensen's alpha for the lowest traditional accrual decile is positive but insignificant, the Jensen's alpha for the traditional accruals-based hedge portfolio is positively significant (1.0% per month, t-value = 2.44) even after the Fama–French risk factors are controlled for.

For comparison, Panel C and Panel D of Table 10 report the CAPM regressions and Fama–French three-factor time-series regressions for the re-constructed percent accrual decile portfolios using the same sample of Panel A and Panel B of Table 10. Jensen's alpha is significantly positive for the percent accruals-based hedge portfolio, the lowest percent accrual decile, and the highest accrual decile in both the CAPM regression and the Fama–French regression. Taken together, Tables 9 and 10 provide supporting evidence that the firms belonging to (*TACC1* ∗ *TCASH1)* are the reason for the failure to document the accrual anomaly in Korea.

5.4. Additional tests

To examine the robustness of findings in the previous sections, we conduct three additional tests: (i) other size proxy deflators for accruals, (ii) the robustness of percent accruals to research design choices, and (iii) re-examination of prior studies.

5.4.1. Other size proxy deflators for accruals

Here, we examine whether accruals scaled by size proxies other than total assets also yield insignificant hedge returns. As mentioned in Section 3, accruals deflated by any size proxy tend to have similar sorting characteristics. Thus, we predict that the trading strategy returns based on accruals deflated by a size proxy will be as low as the trading strategy returns based on traditional accruals. For size proxies, we employ three variables—market value of equity, book value of equity, and sales. Similar to the previous section, we sort stocks into deciles based on accruals scaled by three size proxies and construct accruals hedge portfolios by taking a long position in the lowest accrual decile and a short position in the highest accrual decile at the end of the third month after the fiscal year-end. The results shown in Table 11 are similar to those obtained using accruals scaled by total assets as reported in Table 4. Annual size-adjusted returns in the lowest accrual decile portfolio are extremely negative—as low as the highest accrual decile portfolio for all size proxies. Thus, accruals hedge returns become insignificant across all three size related deflators. This is due to the fact that the lowest decile of accruals scaled by a size proxy tends to include extreme loss firms that have extremely negative stock returns. Thus, we conclude that accruals scaled by any size proxy tend to misclassify poorly performing firms into the lowest accruals portfolio while percent accruals do not. This misclassification may lead to the incorrect conclusion that the accrual anomaly does not exist.

5.4.2. The robustness of percent accruals to research design choices

We also investigate whether the percent accruals-based hedge portfolio is robust to different research design choices. Taylor and Wong (2012) show that the accrual anomaly is sensitive to research design choices when traditional accruals are used to measure accruals. To the best of our knowledge, however, no study has examined the sensitivity of percent accruals to research design specifications. To investigate the effect of research design choices on the stock returns for the percent accruals-based portfolio compared to the stock returns for the traditional accruals-based hedge portfolio, we focus on i) the definition of abnormal returns, ii) methods of data trimming, especially for extremely large positive returns, and iii) the choice between equal- and value-weighted accrual portfolio returns. There are the research design choices examined by Taylor and Wong (2012).

In an untabulated analysis, we find that the traditional accruals hedge returns are insignificant and that the lowest traditional accrual decile still yields extremely low returns, regardless of how we measure the benchmark portfolio or how we deal with extreme returns. In contrast, we find that percent accruals hedge returns are significant across research design choices. Notably, the lowest percent accrual decile

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delivers the largest positive returns among all deciles, regardless of the choice of the weighting scheme in computing size benchmark portfolio returns and outlier treatment. We also find similar results using a value-weighted accruals portfolio, which indicates that the weighting scheme of accruals portfolios does not affect the overall behavior of traditional or percent accruals portfolios. This is in contrast to the findings of Taylor and Wong (2012) which document that value-weighted traditional accruals hedge portfolios do not generate as much positive returns as equal-weighted traditional accruals hedge portfolios.

In sum, the superior performance of the percent accruals-based hedge portfolio compared to the traditional accruals-based hedge portfolio is robust to research design choices. Specifically, regardless of research design choices, the lowest traditional accrual decile exhibits extremely negative returns and the lowest percent accrual decile displays highly positive returns.

5.4.3. Re-examination of prior studies

Several studies support the existence of the accrual anomaly in Korea (Na, 2006; Kang and Choi, 2009), using traditional accruals. However, these prior studies test for the accrual anomaly by using different sample selection criteria. We repeat our tests using the sample selection criteria of these prior studies. The sample periods start from the same beginning year of each prior study up to 2010.[26] For comparison purposes, we also run our tests without imposing any data restrictions.

First, we replicate Na (2006). Following Na (2006)[27], we eliminate (i) firms with annual total asset growth below −50% or above 50%, (ii) firms with negative book value, (iii) firms without next-period earnings data. In addition, we (vi) truncate the sample at the top and bottom 1% of main variables including returns. In an untabulated analysis, we find that size-adjusted stock returns decrease with traditional accruals and its hedge returns are statistically positive. The most notable difference from Table 4 is that abnormal stock returns in the lowest traditional accrual decile are significantly positive, indicating that sample selection criteria of Na (2006) exclude firms yielding negative returns from the lowest traditional accruals. However, abnormal returns in the lowest percent accrual decile (8.16%) are still higher than returns in the lowest traditional accrual decile (5.72%). For the sample without any data restrictions, hedge returns based on traditional accruals become insignificant because stock returns in the lowest traditional accruals are negative, which is similar to Table 4. In contrast, hedge returns based on percent accruals are still significantly positive.

Additionally, we replicate Kang and Choi (2009). To follow Kang and Choi (2009), we include only firms that survive throughout the sample period and also eliminate firms with i) absolute value of ROA larger than 1, ii) absolute value of accruals larger than 1, iii) absolute value of size-adjusted returns larger than 2, iv) leverage larger than 1, v) negative book value of equity, and vi) buy-and-hold returns greater than 200%. In an untabulated analysis, we confirm the results in Kang and Choi (2009) that the hedge returns based on traditional accruals are significantly positive, although the stock returns in the lowest accrual decile are much lower than the second lowest accrual decile. Hedge returns based on percent accruals are still significantly positive In the sample of no restrictions, however, hedge returns based on traditional accruals are negative because stock returns in the lowest accrual decile (−20.65%) are much lower than ones in the highest accrual decile (−11.61%). These findings indicate that prior studies that document evidence that supports the accrual anomaly usually eliminate firms with weak fundamentals that would have ended up in the lowest traditional accrual decile. Including these firms in the sample is likely to be the reason that previous studies using traditional accruals fail to find evidence of the accrual anomaly. In contrast, we confirm the existence of the accrual anomaly regardless of the sample selection criteria when firms are sorted by percent accruals. Taken together, the replication results suggest that traditional accruals are sensitive to the sample selection criteria while percent accruals are robust.

[26] We use year 2010 as the ending year of sample period to show that the existence of the accrual anomaly is not driven by different sample periods. When we use the same sample period the results are qualitatively similar.

[27] Following Na (2006), we also compute traditional accruals as in Sloan (1996) using the balance sheet approach.

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6. Concluding remarks

Using percent accruals, we document the existence of the accrual anomaly in Korea, which is not evident when using traditional accruals. Our finding is robust to other size proxy deflators, sample selection criteria and other research design choices. We also identify the source of relatively low returns in the lowest traditional accrual decile. These low returns eliminate any abnormal returns of the accruals-based trading strategy in the Korean stock market.

The most important take-away from this study is that using size proxies, including total assets, to deflate accruals can be potentially problematic when testing for the accrual anomaly. When size proxies are used to deflate accruals, poorly performing firms with both negative accruals and negative cash flows are sorted into the lowest accrual decile. As a result, these firms yield extremely low returns, dampening the stock returns in the lowest traditional accrual decile. In contrast, when percent accruals are used to measure accruals, most of the firms in the lowest percent accrual decile have large positive cash flows, while poorly performing firms are spread around the middle deciles. As a result, stocks in the lowest percent accrual decile yield significant positive returns.

Our findings have immediate implications for accrual anomaly tests in other countries. We raise the possibility that the accrual anomaly, which reportedly does not exist in some countries based on traditional accruals, could actually exist when tested with percent accruals (Chan et al., 2006; Clinch et al., 2012; Koerniadi and Tourani-Rad, 2007). Furthermore, one could investigate whether the effectiveness of using percent accruals vary across countries depending on institutional environment factors. In addition, we also provide direct implications for practitioners. The percent accruals-based trading strategy is easily implementable because of high positive returns of the long position in the lowest percent accrual decile. This is because the long position entails neither high transaction costs nor limits to arbitrage as much as the short position in the highest percent accrual decile.

Two caveats are in order. First, our results do not imply that a trading strategy based on percent accruals always perform better than traditional accruals. But when firms with negative stock returns are sorted into the lowest decile based on traditional accruals, using percent accruals is a sound alternative. Second, our results do not imply that earnings work better as a deflator than size proxies in other capital markets-based accounting research (Barth and Clinch, 2009). We only provide evidence that earnings are a useful deflator for accruals because it effectively identifies the extreme accruals.

Appendix A. Comparison of earnings announcements in Korea and in the U.S. and of related press coverage through the example of actual firms

Table A1
Hynix's earnings announcements for the fiscal year 2010 on the Korea Investors Network for Disclosure (KIND) system.

Consolidated earnings estimate (in trillion KRW)						
		Current Term ('10.4Q)	Previous Term ('10.3Q)	Changes over the Previous Term (%)	Same Term of last Year ('09.4Q)	Changes over the Same Term of last Year (%)
Sales	Amount	2.66	3.27	−18.7%	2.67	−0.2%
	Accumulated Amount	11.97	9.31	–	7.52	59.2%
Operating Income	Amount	0.32	0.99	−67.9%	0.59	−46.3%
	Accumulated Amount	3.09	2.77	–	−0.12	–
Net Profit from Continuing Operation before Corporate Income Tax	Amount	0.19	1.06	−81.6%	0.61	−67.9%
	Accumulated Amount	2.70	2.51	–	−0.40	–
Net Income	Amount	0.11	1.06	−89.6%	0.65	−83.1%
	Accumulated Amount	2.65	2.54	–	−0.35	–

As of 2011.01.27.
Source: kind.krx.co.kr.

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Table A2
Apple's earnings announcements for the fiscal year 2010 on the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system.

Apple Inc.
UNAUDITED CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(in millions, except share amounts which are reflected in thousands and per share amounts)

	Three Months Ended	
	December 25, 2010	December 26, 2009
Net sales	$ 26,741	$ 15,683
Cost of sales (1)	16,443	9,272
Gross margin	10,298	6,411
Operating expenses:		
Research and development (1)	575	398
Selling, general and administrative (1)	1,896	1,288
Total operating expenses	2,471	1,686
Operating income	7,827	4,725
Other income and expense	136	33
Income before provision for income taxes	7,963	4,758
Provision for income taxes	1,959	1,380
Net income	$ 6,004	$ 3,378
Earnings per common share:		
Basic	$ 6.53	$ 3.74
Diluted	$ 6.43	$ 3.67
Shares used in computing earnings per share:		
Basic	919,294	903,542
Diluted	933,154	919,783

As of 2011.01.19
Source: http://www.sec.gov/edgar.shtml#.VBfgxMKSymZ

Table A3
Wall Street Journal (WSJ) article on earnings announcement of Hynix.

Hynix Net Falls 83%
By Jung-Ah Lee
Updated Jan. 26, 2011 11:31 p.m. ET
http://online.wsj.com/articles/SB10001424052748704721104576106803528969650
SEOUL—Hynix Semiconductor Inc. said Thursday its fourth-quarter net profit fell 83% from a year earlier, largely due to a steep decline in computer memory-chip prices caused by sluggish demand for personal computers.
……
For the three months ended Dec. 31, Hynix posted a net profit of 110.1 billion won ($98.7 million), down sharply from 657 billion won a year earlier. In the previous quarter the company record profit of 1.06 trillion won, mainly thanks to high-margin products, such as mobile dynamic random-access memory chips.
The latest result was worse than expected. Six analysts polled by Dow Jones Newswires had on average forecast a net profit of 244.1 billion won. Operating profit was 417.6 billion won, down from 708.3 billion won a year earlier. Sales fell 1.8% to 2.748 trillion won from 2.799 trillion won. …..

The underline has been added for emphasis.

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Table A4
WSJ article on earnings announcement of Apple.

Apple Soars, but Mum on Jobs
By YUKARI IWATANI KANE
Updated Jan. 19, 2011 12:01 a.m. ET
http://online.wsj.com/news/articles/SB10001424052748703954004576090362119740134
Apple Inc. AAPL +0.49% posted a 78% surge in profit and record sales of its gadgets in the holiday quarter, but the company's executives ignored the elephant in the room—the sudden medical leave of Chief Executive Steve Jobs. …….
Apple gave a strong forecast, saying it expected earnings per share of $4.90 in the current quarter, up 47.1% from a year ago, on revenues of about $22 billion, up about 63% from a year ago. That was above analysts' estimates of $4.43 and $20.6 billion, respectively, according to Thomson Reuters.
For the quarter ended Dec. 25, Apple reported a profit of $6 billion, or $6.43 per share. Revenue was $26.7 billion, up from $15.68 billion a year ago. …….

The underline has been added for emphasis.

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