

# “The accrual anomaly in the Greek stock market”

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## The accrual anomaly in the Greek stock market

### Abstract

The authors examine the negative relation of traditional accruals and % accruals with future returns in the Greek stock market. Positive abnormal returns from hedge portfolios on both accrual measures summarize the economic significance of this negative relation. The magnitude of returns obtained from traditional accruals is higher than that obtained from % accruals, contrary to existing evidence from the U.S. capital market. The analysis suggests that the accrual anomaly appears to be present in the Greek stock market: this has macroeconomic implications because firms with low reported accruals may exhibit higher stock returns and at this time, during the ongoing Greek capital market crisis, investors are more likely to gain substantial abnormal returns in the future – if and when the Greek economy returns to positive growth.

**Keywords:** accruals, stock returns, Greece.

**JEL Classification:** M4.

### Introduction

The recent crescendo of the Greek capital controls crisis left the country with its banks and stock market closed. It has become a possibility that the Athens Stock Exchange (ASE) might be downgraded to “standalone” by Morgan Stanley Capital International (MSCI). However, the Greek stock market has seen way better days before the onset of the crisis. Examining the presence of the accrual anomaly during its heydays to just before 2011 may shed new information not only about its past workings, but also on how it may rebound, if it does, in the future.

Sloan (1996) was the first who demonstrated the accrual anomaly in the U.S. capital market and he examined the impact of different persistence levels of the cash flow and the accrual components of earnings and the resulting impact on stock prices. Sloan (1996) tested stock market efficiency, by examining the relationship between cash flow and the accrual component of earnings. His findings suggested a negative association between accounting accruals and stock price performance. This negative relationship is what is called the accrual anomaly. He interpreted his findings as investors fixating too heavily on corporate earnings when forming expectations stock prices. Investors are likely to overestimate accruals in establishing earnings expectations, but, then, they are amazed when accruals demonstrate low persistence in the future. Hedge – trading strategies consisting of

purchasing low accrual firms and selling high accrual firms, many, thus, generate positive risk-adjusted returns.

Follow up research, based on U.S. data, reports extensive evidence on the robustness of the accrual anomaly and raises the question of whether the accrual effect also occurs in other countries. The international setting of the accrual anomaly was first investigated by Pincus, Rajgopal and Venkatachalam (2007). They show that the accrual anomaly is found outside the US capital market (in Australia, Canada and the UK), and its existence is associated with specific accounting and institutional factors like legal tradition, shareholder protection, permission to use accrual accounting and ownership concentration. Moreover, they provide additional evidence on the magnitude of the accrual effect on stock returns throughout the world. According to them, earnings management and barriers to arbitrage contribute to the existence of the global accrual anomaly.

Many other studies<sup>1</sup> explore the existence of the accrual anomaly on capital markets of developed countries like U.S. and E.U. Papanastasopoulos (2014) was the first who investigated the existence of the accrual anomaly in Greece, but in the context of 15 European Union countries plus Switzerland.

The motivation of this study is to examine the occurrence and magnitude of the accrual anomaly in the Greek capital market, taking our cue from the results reported about Greece from Papanastasopoulos (2014) and extending them. In his paper, Papanastasopoulos works with European data and Greece is only examined as one of the countries in his group. However, ours is the first paper, to the best of our knowledge that will try to provide extensive and possibly highly suggestive evidence about the

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<sup>1</sup> See, for example, Barth and Hutton (2004), Beneish and Vargus (2002), Chan et al. (2006), Collins and Hribar (2002), Dechow et al. (2008), Hirschleifer et al. (2012), Thomas and Zhang (2002), Pincus et al. (2007), La Fond (2005), Soares and Stark (2009, 2011), Leipold and Lohre (2012).

possible occurrence of the accrual anomaly in Greece as a standalone country. In particular, the objective of our research is to examine the possible generalizability of the accrual anomaly with respect to stock returns in Greece. We extend the Papanastasopoulos (2014) study by (1) by considering a longer sample period which includes the recent economic crisis, (2) by dividing the sample in two distinctive periods, the pre-euro era and after the adoption of euro as Greece's official currency and (3) by performing a more detailed analysis on the magnitude and significance on the presence of the accrual anomaly.

Our results suggest that the accrual anomaly appears to be present in the Greek equity market, in contrast to Papanastasopoulos (2014). While we match the qualitative results of Papanastasopoulos (2014) when using quintiles instead of deciles in constructing our hedge portfolios, when using the finer decile split, we do find the presence of the accrual anomaly. This is an interesting finding, because it can be related to two issues, particular to the Greek economy. First, there appears to be a business scale problem, i.e., when we are using deciles, we can obtain firms with a more detailed structure in having low accruals – and it is from these firms that the accrual anomaly is probably being driven. Second, this relates to the productive structure of the Greek economy, i.e., the presence (during our sample period) of many new SMEs – rather than larger firms and firms that are established for many years. In addition, when considering test regressions, we cannot find conclusive evidence for the presence of the anomaly, when using the traditional Fama-McBeth (1973) type of regressions – although they do tend to support the accrual anomaly more for traditional accruals and after the period of the 1990's. When using the Petersen (2008) type standard errors, we do find higher significance for the presence of the accrual anomaly in all accrual measures we use, save for the case where we group by firm and year where significance is present but lower. This of course is due to the fact that the Greek economy underwent significant structural changes during the 1990's and after the period of the Olympic games of 2004 which lead to the 2008 fiscal crisis.

The Greek stock market, before the 1980's, was a small emerging market. Morgan Stanley Capital International categorizations (MSCI) classified the Greek stock market as a developed market, since May 2001 which is related to the potential break in the workings of the accrual anomaly across the years of our sample. The Greek market at the 1990s became massively known, as the Greek banking system began to privatize its major banks and interest rates began to fall on the road to EMU. The

introduction of listed, large public companies helped to spread the ownership of shares in Greece. At the end of the decade, the stock market had about 1.5 million active shareholders who were looking for more profitable investments than the meager rates on deposits and the few other investment tools. Since 2000, Greece launched a new legislation that improved the already existing one advancing investors' protection and introducing corporate governance. However, the explosion of deficits and debt following the 2004 Olympic games and the huge fiscal mis-management that followed, the 2008 crisis and the continued downward pressure in the Greek economy obliterated stock market valuations, created a structural shift in stock market performance and drastically changed the way investors, locals and foreigners, see the evolution of the Greek equities. However, even the possibility of a return to normalcy for the Greek economy and its stock market can generate anticipation for large and abnormal returns. It is, therefore, of significant interest to examine how the accrual anomaly is present in the historical data, because a return to a higher liquidity environment, an environment of political stability, a conclusion of structural reforms and the potential of positive growth will upgrade stocks valuations: one would, therefore, would like to know where and how to invest based on the presence and magnitude of the accrual anomaly. This can potentially happen if the productive structure of Greece remains the same or during the transition period to a new productive structure which, in any case, cannot exist without SMEs.

The remainder of the paper is organized as follows. Section 1 expands on the development of our main hypothesis. Section 2 provides details about our data, sample formation, and variable measurement. Section 3 critically discusses our empirical results. Finally, we offer some concluding remarks in final section.

## 1. Hypothesis development

Ball and Brown (1968) were the firsts who investigated the association between earnings and stock returns. Their study suggested that unexpected earnings changes have positive correlation with future stock returns. Several studies after them have explored the relationship between earnings and stock returns, (e.g., Beaver, Lambert and Morse, 1980; Kormendi and Lipe, 1987; Easton and Harris, 1991; Kothari, 2001; Demitras and Zirek, 2011).

Sloan (1996), in his influential paper, investigated whether stock prices reflect information about future earnings contained in the accrual and cash flow components of earnings. His findings suggest that firms with low (high) accruals tend to have high (low) earnings performance and stock returns in the

future. It argues that investors fail to distinguish between the different properties of the components of earnings, i.e., accruals and cash flows for future earnings performance. He also developed a hedge trading portfolio strategy that is taking long position in the portfolio of firms with low accruals and short position in the portfolio of stocks consisting of firms that report a high level of accruals. This hedge portfolio strategy gained positive abnormal returns.

Xie (2001) decomposed total accruals into normal and abnormal accrual components using Jones' (1991) model. His results suggest that the market overestimates the persistence of abnormal accruals and consequently overprices them. He also claimed that the overpricing of total accruals found in Sloan (1996) was due largely to abnormal accruals. Many other studies test numerous components of total accruals to determine which components can best explain the accrual anomaly (e.g., Thomas and Zhang, 2002; Richardson et al., 2005; Chan et al., 2006; Allen, Larson and Sloan, 2013).

All the above studies are based on US data, which gets the question "is the accrual anomaly a global phenomenon?" Pincus et al. (2007) examined stock markets in 20 countries, the US included, investigating the case that the occurrence of the anomaly is related to country differences in accounting and institutional structures. They found, by analyzing 19 capital markets outside the U.S.A., that the market overweights the lower persistence of working capital accruals on the capital markets of Australia, Canada and the U.K. Some researchers provide evidence that legal system of a country, common vs. code law, in which enterprises operate play a significant role, because it forms the accounting structure and quality (Ball et al., 2000; Soderstrom and Sun, 2007). Other researchers, e.g., Leppold and Lohre (2012) provide evidence that the accrual anomaly exists in both common law (Australia, Canada, Hong Kong, Ireland, Thailand, the U.K. and the U.S.) and code law countries (Denmark, France, Germany, Italy, Japan, Switzerland). There are also studies which examine the case that accrual anomaly exists in developed (US and EU countries) and developing countries<sup>2</sup>.

Papanastasiopoulos (2014) provided evidence that the accrual anomaly exists in 11 of 16 European countries: Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain and Sweden, Switzerland, and the UK. Based on several accrual measures, the accrual anomaly is absent in Austria, Finland, Greece, Ireland and Portugal.

In this study, we investigate the possible occurrence and economic significance of the negative relation between accounting accruals and future returns in the Greek capital market. As noted in the introduction, Greece is a case of special interest both because of the meteoric rise of the Greek market up to 2000 and because of the still drained Greek economy after the crisis. Furthermore, there are clear interesting opportunities when the Greek economy eventually revives. Thus, having an understanding of how and why the accrual anomaly occurs in Greece is an issue of current and future significance. The main testable hypothesis of the paper is thus as follows:

**Hypothesis 1 (H1):** The accrual anomaly occurs in the Greek capital market.

We examine this hypothesis with various methods, first with regressions of future raw returns, after controlling for size and book-to-market ratio. We also investigate the magnitude of future returns generated from hedge portfolios formed on traditional and % accruals. In our analysis, we take into account the relatively small sample (number of years) available and perform many robustness checks to validate our findings. In addition to the construction of hedge portfolios, we utilize the standard regression formulations where, as we regress (either using the Fama-McBeth (1973) or the Petersen (2008) approaches, the next period returns  $RET_{t+1}$  to size  $SIZE_t$ , book-to-market value  $BM_t$  and the accrual variable  $ACC_t$ , as in:

$$RET_{t+1} = \gamma_0 + \gamma_1 SIZE_t + \gamma_2 BM_t + \gamma_3 ACC_t + v_{t+1}.$$

The presence of the anomaly is suggested by a negative and statistically significant coefficient  $\gamma_3$  in the above formulation. The main difference between the Fama-McBeth and Petersen approaches is the way that the corresponding standard error for this coefficient is estimated.

Sloan (1996) used a sample of NYSE/AMEX firms over the period 1962-1991 and calculated abnormal returns through the CAPM (i.e., one – factor alphas) and a characteristic-based benchmark approach that controls for the risk premium associated with firm size (i.e., size-adjusted returns). Further research mainly based on U.S. data, demonstrated that Sloan's results are robust to more recent sample periods. Lev and Nissim (2006) included the Nasdaq firms and Chan et al. (2006) and Hirshleifer et al. (2012) among others take into account additional factors, such as earnings manipulation, extrapolative bias concerning future growth, risk or mispricing.

In some studies, accruals were measured as working capital accruals scaled by contemporaneous average total assets; for example, Healy (1995) defined working capital accruals as the change in net working capital less depreciation expense. This

<sup>2</sup> A list includes Koerniadi and Tourani Rad (2007), Kaserer and Klinger (2008), Dimitropoulos and Asteriou (2009), Soares and Stark (2009), Fazeli and Aflatooni (2010), Khanchel El Mehdi (2011), Clinch, Fuller and Wells (2012), Sehgal, Subramanian and Seisting (2012), Vivattanachang and Supattarakul (2013).

measure is rather narrow, since it ignores accruals relating to net noncurrent operating assets (e.g., capitalized software development costs, capitalized expenditures, long-term receivables) and only incorporates the reversal of a subset of long-term accruals through subtraction of depreciation expense. Richardson et al. (2005) broaden the assessment of accruals by adding long-term accruals and find that the expansive measure of total accruals improves the magnitude of size-adjusted returns on accrual hedge portfolios by more than 40%.

% accruals are introduced by Hafzalla et al. (2011). They recommended that the performance of accrual hedge portfolios can be improved when working capital accruals or total accruals are scaled by the absolute value of earnings rather than of the mean value of total assets. Hafzalla et al. (2011) described the accruals scaled by the average total assets as traditional accruals in contrast to % accruals, the measure of accruals used in their study. They also claim that % accruals measures more precisely investors' misconception of the reverting essence of accruals. Furthermore, Hafzalla et al. (2011) support their new measure of accruals, % accruals, by providing evidence based on data from the US capital market that % accruals reach higher excess returns than traditional accruals.

## 2. Data, sample formation and variable measurement

Data for firm – level accounting and market variables were obtained from DataStream International. The dataset covers all common stocks listed on the Athens Exchange with available financial statement and market data returns and market capitalization from 1987 to 2013. To avoid survivorship bias, we exclude close-end funds, trusts, ADRs, REITs, units of beneficial interest, other financial institutions and foreign firms.

Following Wu and Li (2011), we perform all initial data screenings for basic coding errors via the methods outlined in Ince and Porter (2006). Further, we eliminate firm-year observations with negative book value of equity, negative value of net operating assets and insufficient data to compute total accruals, market capitalization, book-to-market ratio, and one-year-ahead raw and abnormal returns. These criteria yield a final sample size of 3,529 firm-year observations with non-missing accounting-based and market-based variables. All accounting variables are winsorized at the top and bottom 1% of their distributions to mitigate the influence of the outliers.

Traditional and % accruals were calculated through the indirect (balance) method. In particular, the numerator on both measures the annual change in net operating assets (*NOA*). Net operating assets (*NOA*) are equal to the difference between operating

assets (*OA*) and operating liabilities (*OL*). Operating assets (*OA*) are calculated as the residual amount from total assets after subtracting cash and cash equivalents (i.e., financial assets) and operating liabilities (*OL*) as the residual amount from total assets after subtracting minority interest, preferred stock, total debt (i.e., financial liabilities) and total common equity, as follows:

$$OA_t = TA_t - CASH_t, \quad (1)$$

where  $TA_t$  is total assets and  $CASH_t$  is cash and cash equivalents,

$$OL_t = TA_t - MINT_t - TD_t - OPS_t, \quad (2)$$

where  $MINT_t$  is minority interest,  $TD_t$  is total debt and  $OPS_t$  is ordinary and preferred shares, and

$$NOA_t = OA_t - OL_t. \quad (3)$$

Traditional accruals (*TACC*) are measured as the % age change in net operating assets (*NOA*):

$$TACC_t = \Delta NOA_t / NOA_{t-1}. \quad (4)$$

% accruals (*PACC*) are measured as the annual change in *NOA* scaled by the absolute net income (*NI*):

$$PACC_t = \Delta NOA_t / |NI_t|. \quad (5)$$

Market capitalization (*MV*) is measured six months after the financial year-end. Book-to-market ratio (*BM/MV*) is the ratio of the financial year-end book value of equity to market capitalization. We also use the natural logarithm of market capitalization (*SIZE*) and the natural logarithm of book-to-market ratio (*BM*) when performing some of our empirical tests.

Stock returns are calculated inclusive of dividends using the return index provided by Datastream (item RI), which is defined as the theoretical growth in the value of a share-holding unit of equity at the closing price applicable on the ex-dividend date. The raw equity return for a firm at month *j* is calculated as:  $r_j = RI_{j+1}/RI_j - 1$ . Once we get firm-monthly returns, we calculate one-year-ahead annual raw stock return by computing the appropriate compounded future return.

## 3. Empirical results

In this section, we present the empirical results of our analysis, summarized in Tables 1 through 6. In Tables 1a to 1b, we report summary statistics of decile and hedge portfolios for both accrual measures, for the whole sample period of 1987-2011. The tables are differentiated by the use of different accrual measures in computing the portfolios<sup>3</sup>. To examine the robustness of our results in the pre- and post-crisis periods, we repeat the analysis over the 1987-

<sup>3</sup> Despite the fact that we observe low *t*-statistics we note that these are the artifact of the extreme volatility of the late 1990's and mid-2000 and that the low accrual companies exhibit extremely high cumulative returns. See also the tables that refer to the subsamples.

2000 and 2001-2011 sub-periods. In Tables 2a-2b and 3a-3b, we report summary statistics of decile and hedge portfolios for both accrual measures for the period 1987-2000 and 2001-2011, respectively. Six months after financial year-end, stocks are allocated into decile portfolios and the characteristics of equally weighted returns are computed.

Starting with traditional accruals (*TACC*), *NAV* (Net Asset Value of € 1) reaches its highest value in Decile 1 (17.164) for the sub-period 1987-2000 and the lowest in Decile 6 (0.416) for the sub-period 2001-2011 and the average return value has its highest value for the sub-period 1987-2000 (34.03%). From the results for *TACC* we can see that capital gains are again at the highest in Deciles 1-3 for the sub-period 1987-2000, 27.451 cumulatively. We see that we can obtain excess *NAV* gains in Deciles 8-10 (high accruals deciles), as well, but they are again lower than those in Deciles 1-3. Furthermore, we can see that do not obtain *NAV* gains, *NAV* less than 1, in Deciles 5 and 6, for the period 1987-2011, in Decile 5 for the sub-period 1987-2000 and in all Deciles at the sub-period 2001-2011 except of Decile 7. The hedge portfolio does not generate positive abnormal returns again for both the whole tested period 1987-2011 and the sub periods 1987-2000 and 2001-2011. The most volatile Decile is the 6<sup>th</sup> where the second lowest *NAV* is reported. It is interesting to note that we can discuss our results in terms of either *NAV* or average returns, because the rankings that they give us are practically identical because of the high volatility across all deciles. In our subsequent discussion, we use interchangeably average returns and *NAV*.

For % accruals (*PACC*), the highest average return stands for the sub-period 1987-2000 (39.79%), while *NAV* (21.389) is the best in Decile 1 for the whole period 1987-2011 and reaches the lowest value 0.242 for the same period. The best cumulative *NAV*, 26.112, is reported for Deciles 1-3, but for the whole tested period 1987-2011. We see again that excess *NAV* gains could be gained in Deciles 1-3 (low accruals deciles) than those in Deciles 8-10 (high accruals deciles). *NAV* is less than 1, we generate losses, in Deciles 6, 7 and 10 for the 1987-2011 period, in Decile 7 for the sub-period 1987-2000 and in all Deciles at the sub-period 2001-2011 except of Decile 1, the lowest accrual decile. The hedge portfolio generates *NAV* gains portfolio for both the whole tested period 1987-2011 and the sub periods 1987-2000 and 2001-2011, the highest

(7.634) and statistically significant within the tested period 1987-2011 which is consistent with the *NAV* results and the lowest in the sub-period 2001-2011. Here again the most volatile decile is the 6<sup>th</sup> for the 1987-2000 sub-period where the second lowest value of *NAV* is reported.

Our results suggest that the best *NAV* value is observed for *TACC* for the sub-period 1987-2000 and excess capital gains could be obtained at low accrual deciles which, in turn, implies that the accrual anomaly seems to be present in the Greek Capital Market for the whole tested period 1987-2011. A more detailed comparative analysis is presented below.

When we compare the results within and across the different types of accruals, we see that % accruals produce better results, because the change in Net Operating Assets ( $\Delta NOA$ ) is scaled by the absolute Net Income (*NI*) that focuses on the composition of earnings. This implies that a typical company in the extreme negative % portfolio has positive cash from its operations and the typical company in the extreme positive % portfolio has negative cash from its operation, but both companies do not accrue any income that suggest that firms in the first decile have negative accruals and firms in the highest decile have positive accruals. Note that % accruals are also insensitive to firm size, unlike the traditional accrual measure.

In general, we can see from the above results that, although there is strong evidence that low accrual companies do produce higher future returns, the hedge portfolios are not always successful in generating high future returns. This confounding of the results can be attributed not only to accrual measurement (which also relates to changes occurred in Greece with the introduction of the IFRS), but also to other kinds of structural changes occurring during the period of observation, as noted also in the introduction. One example could be that during the period of rising stock prices many businesses expanded their operation, new businesses enter the productive economy, and the combination of these effects could be negatively linked with lower traditional accruals. Therefore, one can say that the pronounced presence of the accrual anomaly in later years, i.e., even after the crash of 2000 and the fiscal crisis of 2008, can be attributed to a sort of “residual effect” from companies that were either unscathed by the crises or new entrants that were looking for opportunities during the periods of rebounding of the economy.

We also note that our findings reveal a substantial variation of traditional and % accruals across the sample and confirm Hafzalla et al. (2011) findings that % accruals are more extreme measures than traditional accruals.

<sup>3</sup> Despite the fact that we observe low *t*-statistics we note that these are the artifact of the extreme volatility of the late 1990's and mid-2000 and that the low accrual companies exhibit extremely high cumulative returns. See also the tables that refer to the subsamples.

Turning next to our test regressions, we, first, considered the standard approach of Fama-McBeth (1973), but we found that we cannot obtain any corroborative evidence for the presence of the anomaly using the full sample. As our previous results have suggested the presence of some breaks in the occurrence of the anomaly, as well as the extreme portfolio volatility, we estimate the same type of regressions in a moving window that first omits the initial year, the omits the first two initial years, etc. With this approach we find that the evidence from this type of regression is concentrated from the early and mid 1990's and mostly for traditional accruals. These results are given in Tables 4 and 5. We note that, although we use ranked and scaled deciles as well, our approach of controlling for the period of estimation shows that any regression-based evidence is not driven by these transformation<sup>4</sup>.

On the other hand, in Tables 6a and 6b, we present results on the use of Petersen-type standard errors. Here the results are in stark contrast to the Fama-McBeth-type of regressions, as we do find strong evidence in favor of the presence of the anomaly. Specifically, we find that pooling of the data, heteroscedasticity corrections or grouping by firm, show strong significance for the estimate of the parameter in front of our accounting variables (all estimates being of the correct, negative, sign). Significance drops when we account for grouping by year or by firm and year, which suggests that our previous arguments about the effect of breaks in the Greek economy and the presence of the anomaly are most possibly valid. Nevertheless, even when grouping by year or firm and year we still obtained significant estimates in some cases. In general, these results show more significance for the traditional accruals, a further result consistent with our structural explanations before about why the accrual anomaly might hold for the Greek economy.

## Conclusions

The accrual anomaly, from the time of its discovery till now, is one of the most robust anomalies ever

discovered. It was firstly demonstrated by Sloan (1996), and refers to the negative association between accounting accruals and stock returns. Sloan's (1996) results imply that firms with high (low) reported accruals in a fiscal period tend to have low (high) future profitability and stock returns. He also showed that hedge-trading strategies constructed by purchasing low accrual firms and selling high accrual firms, generates positive returns.

In this paper, expanding on the work of Papanastasopoulos (2014), we examine in some depth the issue of the presence of the accrual anomaly in the Greek stock market. As we discussed previously, there is great interest in the case of Greece for the potential upside that its economy and its stock market has, if and when they return to positive paths. In this good scenario, knowing whether the accrual anomaly holds or not can greatly enhances not only those looking for investment opportunities, but it can also be linked to a potential transformation of the Greek productive structure.

The combined results of our analysis do strongly suggest that low accrual firms did have higher future returns, actually quite higher returns that firms with high accruals, in an environment of extremely high volatility, structural changes in the economy, market crashes and fiscal crises. We claim that it is possible to account for the presence of the accrual anomaly because of the particular current productive structure of the Greek economy, especially its high reliance on old and new SMEs, i.e., the presence (during our sample period) of many new SMEs rather than larger firms and firms that are established for many years.

A number of issues remain still unexplored on the relationship of accounting variables with future profitability in the Greek economy. We leave these issues for future research.

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<sup>4</sup> Desai, Rajopal and Venkatachalam (2004) argue that the estimation of regressions using scaled decile has two main advantages. First, the slope coefficient can be interpreted as the abnormal return to a zero-investment portfolio strategy that takes a long (short) position on firms with high (low) levels of the respective measure. Second, scaled decile ranks controls for potential nonlinearities and ensure that results are not driven from extreme observations.

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## Appendices

Table 1a. Performance statistics on accrual portfolios of traditional accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 1	19.04%	50.20%	1.897	0.379	9.995
Decile 2	17.04%	67.27%	1.267	0.253	2.054
Decile 3	18.04%	63.54%	1.420	0.284	3.405
Decile 4	14.92%	64.44%	1.158	0.232	1.493
Decile 5	8.49%	49.48%	0.858	0.172	0.871
Decile 6	11.98%	67.65%	0.885	0.177	0.707
Decile 7	14.20%	53.87%	1.318	0.264	2.282
Decile 8	16.84%	65.56%	1.284	0.257	1.879
Decile 9	13.86%	58.82%	1.178	0.236	1.265
Decile 10	16.77%	60.25%	1.392	0.278	2.181
Hedge portfolio	2.27%	34.07%	0.333	0.067	0.099

Notes:

1. Period of evaluation 1987-2011.
2. Traditional accruals are measured as the %age change in net operating assets (*NOA*), i.e.  $TACC_t = \Delta NOA_t / NOA_{t-1}$ .
3. Results are for statistics on equally weighted portfolios for each decile.
4. The hedge portfolio is formed by  $H_t = (Decile\ 10)_t - (Decile\ 1)_t$ , where  $(Decile\ j)_t$  is the return of year  $t$  of decile  $j$ .
5. Sharpe: the Sharpe ratio the mean return over its standard deviation correct in all tables.
6. NAV: Net Asset Value of € 1 invested in the portfolio.

Table 1b. Performance statistics on accrual portfolios of % accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 1	26.01%	65.30%	1.992	0.398	21.389
Decile 2	17.07%	60.07%	1.421	0.284	3.365
Decile 3	13.44%	61.60%	1.091	0.218	1.358
Decile 4	13.93%	55.46%	1.255	0.251	2.522
Decile 5	12.98%	61.67%	1.053	0.211	1.342
Decile 6	13.77%	68.04%	1.012	0.202	0.618
Decile 7	3.53%	49.74%	0.355	0.071	0.242
Decile 8	14.20%	58.47%	1.214	0.243	1.248
Decile 9	21.45%	69.82%	1.536	0.307	4.039
Decile 10	12.85%	60.74%	1.058	0.212	0.930
Hedge portfolio	13.16%	36.93%	1.782	0.356	7.634

Notes:

1. Period of evaluation 1987-2011.
2. % accruals are measured as the annual change in *NOA* scaled by the absolute net income (*NI*), i.e.  $PACC_t = \Delta NOA_t / |NI_t|$ .
3. Results are for statistics on equally weighted portfolios for each decile.
4. The hedge portfolio is formed by  $H_t = (Decile\ 10)_t - (Decile\ 1)_t$ , where  $(Decile\ j)_t$  is the return of year  $t$  of decile  $j$ .
5. Sharpe: the Sharpe ratio the mean return over its standard deviation correct in all tables.
6. NAV: Net Asset Value of € 1 invested in the portfolio.

Table 2a. Performance statistics on accrual portfolios of traditional accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 1	34.03%	57.01%	2.234	0.597	17.164
Decile 2	29.68%	83.63%	1.328	0.355	3.383

Table 2a (cont.). Performance statistics on accrual portfolios of traditional accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 3	32.21%	76.21%	1.581	0.423	6.904
Decile 4	24.28%	79.64%	1.141	0.305	2.135
Decile 5	11.04%	56.76%	0.728	0.195	0.988
Decile 6	23.05%	84.26%	1.024	0.274	1.701
Decile 7	19.21%	61.34%	1.172	0.313	2.224
Decile 8	26.30%	77.89%	1.263	0.338	2.777
Decile 9	23.16%	67.75%	1.279	0.342	2.424
Decile 10	26.61%	70.41%	1.414	0.378	3.332
Hedge portfolio	7.43%	35.85%	0.775	0.207	0.714

Notes:

1. Period of evaluation 1987-2000.
2. Traditional accruals are measured as the %age change in net operating assets (*NOA*), i.e.  $TACC_t = \Delta NOA_t / NOA_{t-1}$ .
3. Results are for statistics on equally weighted portfolios for each decile.
4. The hedge portfolio is formed by  $H_t = (Decile\ 10)_t - (Decile\ 1)_t$ , where  $(Decile\ j)_t$  is the return of year  $t$  of decile  $j$ .
5. Sharpe: the Sharpe ratio the mean return over its standard deviation correct in all tables.
6. NAV: Net Asset Value of € 1 invested in the portfolio.

Table 2b. Performance statistics on accrual portfolios of % accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 1	39.79%	77.33%	1.925	0.515	18.649
Decile 2	26.74%	73.88%	1.354	0.362	3.555
Decile 3	23.16%	77.12%	1.124	0.300	2.033
Decile 4	20.78%	66.50%	1.169	0.313	2.760
Decile 5	25.10%	77.60%	1.210	0.323	2.650
Decile 6	23.79%	83.71%	1.063	0.284	1.266
Decile 7	8.98%	59.90%	0.561	0.150	0.654
Decile 8	24.04%	65.90%	1.365	0.365	2.798
Decile 9	34.00%	81.78%	1.555	0.416	6.041
Decile 10	19.46%	69.96%	1.041	0.278	1.592
Hedge portfolio	20.32%	45.61%	1.667	0.446	5.985

Notes:

1. Period of evaluation 1987-2000.
2. % accruals are measured as the annual change in *NOA* scaled by the absolute net income (*NI*), i.e.  $PACC_t = \Delta NOA_t / |NI_t|$ .
3. Results are for statistics on equally weighted portfolios for each decile.
4. The hedge portfolio is formed by  $H_t = (Decile\ 10)_t - (Decile\ 1)_t$ , where  $(Decile\ j)_t$  is the return of year  $t$  of decile  $j$ .
5. Sharpe: the Sharpe ratio the mean return over its standard deviation correct in all tables.
6. NAV: Net Asset Value of € 1 invested in the portfolio.

Table 3a. Performance statistics on accrual portfolios of traditional accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 1	-0.04%	33.29%	-0.004	-0.001	0.582
Decile 2	0.97%	35.50%	0.090	0.027	0.607
Decile 3	0.01%	38.73%	0.001	0.000	0.493
Decile 4	3.02%	37.97%	0.263	0.079	0.699
Decile 5	5.24%	40.82%	0.425	0.128	0.881
Decile 6	-2.11%	36.93%	-0.189	-0.057	0.416
Decile 7	7.82%	44.65%	0.581	0.175	1.026
Decile 8	4.79%	46.31%	0.343	0.103	0.677
Decile 9	2.03%	45.41%	0.148	0.045	0.522
Decile 10	4.26%	44.28%	0.319	0.096	0.654
Hedge portfolio	-4.30%	32.09%	-0.444	-0.134	0.139

Notes:

1. Period of evaluation 2001-2011.
2. Traditional accruals are measured as the %age change in net operating assets (*NOA*), i.e.  $TACC_t = \Delta NOA_t / NOA_{t-1}$ .
3. Results are for statistics on equally weighted portfolios for each decile.
4. The hedge portfolio is formed by  $H_t = (Decile\ 10)_t - (Decile\ 1)_t$ , where  $(Decile\ j)_t$  is the return of year  $t$  of decile  $j$ .
5. Sharpe: the Sharpe ratio the mean return over its standard deviation correct in all tables.
6. NAV: Net Asset Value of € 1 invested in the portfolio.

Table 3b. Performance statistics on accrual portfolios of % accruals

	Mean	Std. dev.	T-stat	Sharpe	NAV of € 1
Decile 1	8.48%	43.09%	0.653	0.197	1.147
Decile 2	4.77%	35.59%	0.445	0.134	0.947
Decile 3	1.07%	32.80%	0.109	0.033	0.668
Decile 4	5.20%	38.53%	0.448	0.135	0.914
Decile 5	-2.43%	28.87%	-0.279	-0.084	0.506
Decile 6	1.02%	41.00%	0.083	0.025	0.488
Decile 7	-3.40%	34.31%	-0.329	-0.099	0.371
Decile 8	1.68%	47.44%	0.118	0.035	0.446
Decile 9	5.48%	50.05%	0.363	0.110	0.669
Decile 10	4.43%	48.51%	0.303	0.091	0.584
HedgePortfolio	4.05%	20.13%	0.667	0.201	1.275

Notes:

1. Period of evaluation 2001-2011.
2. Traditional accruals are measured as the %age change in net operating assets (*NOA*), i.e.  $TACC_t = \Delta NOA_t / NOA_{t-1}$ .
3. Results are for statistics on equally weighted portfolios for each decile.
4. The hedge portfolio is formed by  $H_t = (Decile\ 10)_t - (Decile\ 1)_t$  where  $(Decile\ j)_t$  is the return of year  $t$  of decile  $j$ .
5. Sharpe: the Sharpe ratio the mean return over its standard deviation correct in all tables.
6. NAV: Net Asset Value of € 1 invested in the portfolio.

Table 4. Significance of regression estimates for *TACC*

Model 1: $RET_{t+1} = \gamma_0 + \gamma_1 SIZE_t + \gamma_2 BM_t + \gamma_3 TACC_t + v_{t+1}$				
	Combinations			
Evaluation dates	1	2	3	4
1987-2011	x	x	x	x
1988-2011	x	x	x	x
1989-2011	x	x	x	x
1990-2011	x	x	x	x
1991-2011	x	x	x	x
1992-2011	x	x	x	x
1993-2011	x	x	x	√
1994-2011	x	x	x	√
1995-2011	x	x	x	√
1996-2011	x	x	x	√
1997-2011	x	x	x	√
1998-2011	x	√	x	√
1999-2011	x	√	x	√
2000-2011	x	√	x	√
2001-2011	x	√	x	√
2002-2011	x	√	x	√
2003-2011	x	√	x	√
2004-2011	x	√	x	√
2005-2011	x	√	x	√
2006-2011	x	√	x	√
2007-2011	x	√	x	√
2008-2011	x	√	x	√
2009-2011	x	√	x	√
2010-2011	x	x	x	√
Log	YES	YES	NO	NO
Ranks	YES	NO	YES	NO
Deciles	YES	YES	YES	YES

Notes:

1. The table presents the occurrence of significant estimates of accruals over a moving estimation window. Results refer to the significance of the estimate of coefficient  $\gamma_3$  in equation  $(RET_{t+1} = \gamma_0 + \gamma_1 SIZE_t + \gamma_2 BM_t + \gamma_3 TACC_t + v_{t+1})$  using the Fama MacBeth (1973) approach.
2. x denotes a non-significant estimate; √ denotes a significant estimate at at least 13,3% level of significance.

Table 5. Significance of regression estimates for *PACC*

Model 2: $RET_{t+1} = \gamma_0 + \gamma_1 SIZE_t + \gamma_2 BM_t + \gamma_3 PACC_t + v_{t+1}$				
Evaluation dates	Combinations			
	1	4	6	7
1987-2011	x	x	x	x
1988-2011	x	x	x	x
1989-2011	x	x	x	x
1990-2011	x	x	x	x
1991-2011	x	x	x	x
1992-2011	x	x	x	x
1993-2011	x	x	x	x
1994-2011	x	x	x	x
1995-2011	x	x	x	x
1996-2011	x	x	x	x
1997-2011	x	x	x	x
1998-2011	x	x	x	x
1999-2011	x	x	x	x
2000-2011	x	x	x	x
2001-2011	x	x	x	x
2002-2011	x	x	x	x
2003-2011	x	x	x	x
2004-2011	x	x	x	x
2005-2011	x	x	x	x
2006-2011	√	√	x	x
2007-2011	√	√	x	x
2008-2011	x	√	x	x
2009-2011	x	√	x	x
2010-2011	x	√	x	x
Log	YES	YES	NO	NO
Ranks	YES	NO	YES	NO
Deciles	YES	YES	YES	YES

Notes:

1. The table presents the occurrence of significant estimates of accruals over a moving estimation window. Results refer to the significance of the estimate of coefficient  $\gamma_3$  in equation ( $RET_{t+1} = \gamma_0 + \gamma_1 SIZE_t + \gamma_2 BM_t + \gamma_3 PACC_t + v_{t+1}$ ) using the Fama MacBeth (1973) approach.
2. x denotes a non-significant estimate; √ denotes a significant estimate at least 13,3% level of significance.

Table 6a. Significance of regression estimates for *TACC* and *PACC*

	Year		TACC		PACC	
			Estimates	t-statistic	Estimates	t-statistic
Combination 1	1987-2011	Plain	-0.0793	-5.7909	-0.0028	-3.8843
		HC	-0.0793	-6.4253	-0.0028	-3.8256
		By firm	-0.0793	-6.7174	-0.0028	-4.1386
		By year	-0.0793	-3.4437	-0.0028	-1.5205
		By firm/year	-0.0793	-3.4872	-0.0028	-1.5385
Combination 2	1987-2011	Plain	-0.0636	-4.4735	-0.0025	-3.5174
		Hc	-0.0636	-5.3123	-0.0025	-3.4929
		By firm	-0.0636	-5.9935	-0.0025	-3.7360
		By year	-0.0636	-3.7458	-0.0025	-1.4405
		By firm/year	-0.0636	-3.9643	-0.0025	-1.4564

Notes:

1. This table presents the occurrence of significance estimates of accruals over 2 periods, 1987-2000 and 2001-2011, along with Petersen (2008) t-statistics.
2. Combination 1 is using non-transformed data and combination 2 is using log-transformed data, pooled and used along with Petersen's standard errors (plain, HC for heteroscedasticity consistent, by year, by firm and by firm/year).

Table 6b. Significance of regression estimates for *TACC* and *PACC*

	End year		<i>TACC</i>		<i>PACC</i>	
			Estimates	t-statistic	Estimates	t-statistic
Combination 1	2000	Plain	-6.9882e-02	-3.7063	-7.1671e-03	-3.6646
		HC	-6.9882e-02	-4.0354	-7.1671e-03	-4.0066
		By firm	-6.9882e-02	-3.9746	-7.1671e-03	-4.3037
		By year	-6.9882e-02	-1.8417	-7.1671e-03	-1.5317
		By firm/year	-6.9882e-02	-1.8366	-7.1671e-03	-1.5473
Combination 2	2000	Plain	-0.0558	-2.1060	-0.0044	-2.4382
		Hc	-0.0558	-3.3110	-0.0044	-2.4384
		By firm	-0.0558	-3.3540	-0.0044	-2.5899
		By year	-0.0558	-1.6692	-0.0044	-1.2434
		By firm/year	-0.0558	-1.6755	-0.0044	-1.2629

	End year		<i>TACC</i>		<i>PACC</i>	
			Estimates	t-statistic	Estimates	t-statistic
Combination 1	2011	Plain	-1.0403e-01	-4.6752	-2.1765	-2.1765
		HC	-1.0403e-01	-5.3036	-2.1765	1.9502
		By firm	-1.0403e-01	-5.9349	-2.1765	-2.0916
		By year	-1.0403e-01	-3.2091	-2.1765	-0.8102
		By firm/year	-1.0403e-01	-3.3356	-2.1765	-0.8196
Combination 2	2011	Plain	-0.0738	-4.5720	-0.0015	-2.0874
		Hc	-0.0738	-5.0055	-0.0015	-1.8762
		By firm	-0.0738	-5.3121	-0.0015	-2.0241
		By year	-0.0738	-3.4796	-0.0015	-0.8013
		By firm/year	-0.0738	-3.5795	-0.0015	-0.8119

Notes:

1. This table presents the occurrence of significance estimates of accruals over 2 periods, 1987-2000 and 2001-2011, along with Petersen (2008) t-statistics.
2. Combination 1 is using non-transformed data and combination 2 is using log-transformed data, pooled and used along with Petersen's standard errors (plain, HC for heteroscedasticity consistent, by year, by firm and by firm/year).

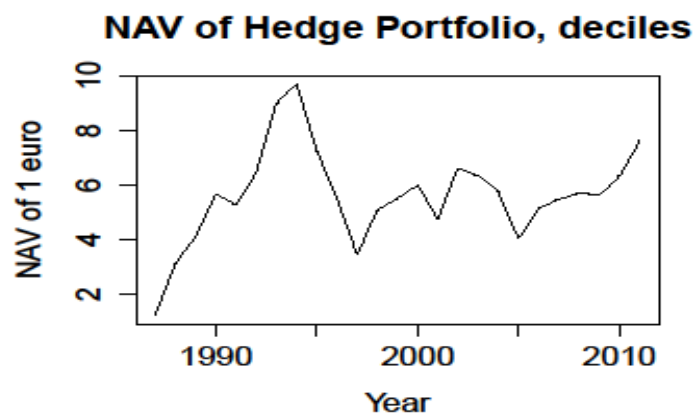


Fig. 1. NAV of accrual portfolios