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# Last Measure Standing – Gross Profitability's Role in the Demise of the Accrual Anomaly

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**Abstract**

We confirm the previously well-evidenced negative relation between the accrual part of earnings and future excess stock returns for the period 1990-1999, and show that this relation has become statistically insignificant for the period 2000-2010. As a contrasting measure underlying only limited accounting subjectivity, we show gross profitability to be negatively related to future excess stock returns under lax controls, and find this relation to become slightly stronger in the period 2000-2010. Based on the theories of earnings manipulation and adaptive market efficiency, we highlight the possibility that the gain in prediction power of gross profits is due to an increase of investors' focus on more objective measures than earnings, as reaction to the revelation of the accrual anomaly.

**Keywords: Accrual Anomaly, Gross Profits, Future Excess Stock Returns, Adaptive Market Efficiency, Accounting Subjectivity**
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**Table of Content**

# 1. Introduction

Although it is widely accepted among valuation researchers and practitioners that Discounted Cash Flow models are necessary to estimate fundamental firm value, many actors in financial markets seem to focus on earnings figures reported in the Income Statement, most notably Net Income (e.g. Hand, 1990). Hence, news regarding missing or reaching earnings expectations can have a significant impact on the stock price of the company. Furthermore, managerial goals, salaries or bonuses are closely linked to a firm's earnings (e.g. Bergstresser and Philippon, 2006). This fixation on earnings has gone to such an extreme that some researchers suggest that other important indicators of operating performance are disregarded completely (Chan et al., 2006). Market actors have to consider the quality of the information provided by the firm, in order to assess whether the data received is accurate and realistically and especially timely represents changes in operating performance (e.g. Kang et al., 2010).

To test to what extent investors focus on the one hand on general earnings information that is influenced by varying accounting quality across firms, and on the other hand on less subjective measures of operating performance, we derive our work from two lines of research. First from the large stream about accrual earnings' relation to future stock returns, that originated from Sloan (1996). Second from the recent exploration of gross profits' predictive power for stock returns by Novy-Marx (2013), as well as papers we compare his results to. We therefore formulate the question:

*Do gross profits or the accrual part of net earnings predict future excess stock returns?*

Sloan (1996) documents a negative relation between the accrual part of a firm's earnings and its stock returns in subsequent years, which is termed the *accrual anomaly*. The accrual part is based on accounting items that bridge the time difference between a business transaction and the corresponding cash flow. Continuing research has largely confirmed this anomaly, and dominantly attributes it to managerial discretion in accounting decisions that investors fail to fully appreciate (e.g. Richardson et al., 2005; Xie, 2001). This view implies the existence of market inefficiencies, since the failure of investors to include accounting quality means that not all publicly available information is reflected in stock pricing (cf. e.g. Bartov et al., 1998). According to the limited research for a more recent period after the year 2000 the accrual anomaly seems to have faded away though (Green et al., 2011; Richardson et al., 2010).

Novy-Marx (2013) finds that gross profits, as proxy for productivity, positively predicts stock returns in the same year. He argues that it reflects true economic profitability well because it is hardly influenced by subjectivity in accounting decisions.

Based on this prior research, we perceive a possibility of gaining further insights into equity investors' use of income statement data. We connect the theory of earnings manipulation as cause of the accrual anomaly to the theory of adaptive market efficiency as reason for its alleged disappearance, to hypothesize that measures less prone to accounting subjectivity than earnings might have gained prediction power since the year 2000. While most previous papers on the accrual anomaly focus on whether investors commonly differentiate between cash flow and accrual parts of earnings, this thesis contrasts the relevance of accruals for investor decisions to that of the readily available and relatively objective measure of gross profits. In order to reach a conclusion about changes in prediction power over time, we divide our sample period into two parts, one from 1990-1999 and one from 2000-2010.

We confirm the existence of the accrual anomaly for our earlier sample period, because we obtain strongly negative and significant accrual coefficients for returns in the following two years when controlling for beta, book size, market leverage and sales growth. More importantly, we add to the evidence of the accrual anomaly's disappearance after the year 2000, because the coefficients turn statistically insignificant. Moreover our findings suggest that gross profits can help predict *future* excess stock returns in a more time-consistent way than accruals during our observation period, because the coefficients are significant for both periods when only controlling for beta and size. Note that the gross profit-return relationship we find is negative and weak, which is an important addition to Novy-Marx's (2013) findings of a positive and strong correlation of gross profitability with *same year's* returns. Ultimately, we find weak evidence in line with our hypothesis of gross profits replacing a small part of the prediction power that accruals lose after the year 2000, because our results show slightly more pronounced gross profit coefficients for the later period with same significance. However, a strong limitation to that evidence is that gross profits' prediction power does not stay intact in either of our time periods when adding market leverage and sales growth as controls.

## 2. Reasons for Rise and Demise of the Accrual Anomaly

Sloan (1996) finds that earnings of firms with a high accrual part of earnings revert more quickly to the mean than those of firms with a higher cash flow part of earnings. He reasons that this is due to accruals being influenced by a higher level of subjectivity than cash flows, making them suitable to boost earnings in individual years but at the same time unlikely to recur with similar magnitude in the following year. Sloan (1996) concludes that investors do not differentiate between these two components of earnings, because the low earnings persistence of high accrual firms results in negative abnormal returns that indicate negative earnings surprises.

There are three main explanations for the existence of the accrual anomaly, which are not mutually exclusive (Chan et al., 2006; Shi and Zhang, 2012). The first is the one of earnings manipulation, which is favored by Sloan (1996) himself. Since the process of recording accruals gives room for discretion, e.g. in the timing of revenue recognition and matching or the decision to capitalize or expense certain costs, deliberate upward bias of accruals by management to inflate earnings is a possibility. This can be motivated by a multitude of factors, many of which are linked to achieving a higher valuation on the stock market (cf. e.g. Kasznik and McNichols, 2002). The extrapolation growth bias, which investors seem prone to (e.g. Lakonishok et al.,1994) offers an alternative explanation. When sales grow strongly, working capital usually increases similarly strongly, which in turn increases accruals because they are mostly based on current balance sheet items. Hence, the market will have overoptimistic expectations for future earnings of growth firms, whose earnings have a larger proportion of accruals. A third explanation is the inability of investors to identify and react to the information about business conditions contained in accruals. For example, high accruals could be caused by a build-up of inventory, which can be a result of lower than expected sales or a deliberately created inventory buffer in the expectation of rising input prices. If investors base their forecasts solely on the earnings figure, such implications of the changing accrual proportion are overlooked. All three explanations imply the existence of market inefficiencies within this context, because in neither case all publicly available information is priced correctly and immediately.

Overall the most evidenced hypothesis is that of earnings manipulation (e.g. Richardson et al., 2005; Thomas and Zhang, 2001; Xie, 2001). A widely reported result in support of it is that the negative relation with future stock returns holds for discretionary accruals, but is insignificant for non-discretionary accruals (e.g. Xie, 2001).

Green et al. (2011) and Richardson et al. (2010) find that from the year 2000 no reliably positive abnormal returns could be generated anymore with hedge portfolios that are invested long in the lowest accrual firms and short in the highest accrual firms, when until that year this was still possible. These results were confirmed by the findings that the accrual-return relation turned insignificant after 2000 in regression models. Both papers favor the explanation of adaptive market efficiency, a term that goes back to Grossman and Stiglitz (1980), and refers to the achievement of market efficiency through the adjustment of investor behavior after the revelation that the previous behavior has been inefficient. Specifically, when there is a large enough amount of capital invested by actors that expect the lower persistence of earnings with high accrual part, the negative accrual-return relation will be traded away. This is because then on average the negative earnings surprise of unaware investors will be equalized by the investment strategy of actors who are aware of the anomaly and are actively trying to exploit it. It is important to note, that only because one stock pricing anomaly is corrected, this does not imply efficiency of the market as a whole, but only efficiency within the delimited context of that dimension of market functionality.

By relating the theory of earnings manipulation as explanation for the accrual anomaly, to the theory of adaptive market efficiency as explanation for the disappearance of the anomaly, we hypothesize that since the turn of the millennium investors base their decisions more strongly on measures that are less prone to managerial discretion. In other words, if manipulation was the reason for the existence of the negative accrual-return relation, and if this relation has really ceased to be significant due to an adaptation of the market, then more objective measures must have replaced, or be used in addition to earnings. As proxy for such measures we use gross profits, because the possibilities to manipulate it are limited to timing of revenue recognition and abuse of the matching principle.

## 3. Method

We use the Fama and MacBeth (1973) regression approach to analyze the relation between future excess stock returns and accruals and gross profits respectively. It allows to obtain cross-sectional means across a time series. A weakness is however, that the resulting standard errors are not corrected for autocorrelation, that is the correlation of a variable’s value at one point in time, with the value of the same variable at an earlier point in time.

Following this procedure, we run cross-sectional regressions for every year of our observation period and calculate test statistics by dividing the results by the square of the number of used years, as we need to obtain standard errors for the cross sectional means of each year's mean. A simple Fama and MacBeth (1973) regression has the form:

$$R_t^{ei} = \beta_i' \lambda_t + \alpha_{it} \quad i = 1, 2, \dots N \; for \; each \; t.$$

As dependent variables we use annual excess stock returns in each of the respective three years (t+1, t+2, t+3) following measurement of the income figures in year t. Annual excess stock returns is the change in stock price of a year compared to the previous year, minus the risk-free rate in the current year:

$$Annual\ Excess\ Stock\ Returns = \frac{Closing\ Price_t - Closing\ Price_{t-1}}{Closing\ Price_{t-1}} - Annual\ Risk\ Free\ Rate$$

To answer our research question, the first explanatory variable is the accrual part of earnings. For this we follow Sloan's (1996) definition:

$$Accruals = (\Delta Current\ Assets - \Delta Cash) - (\Delta Current\ Liabilities - \Delta Short\ Term\ Debt \\ - \Delta Taxes\ Payable) - Depr.$$

We do not use the extended version of the Sloan-Model adopted in Richardson et al. (2005), in order to make our results comparable to previous research about the accrual anomaly, that mainly employs Sloan's (1996) original model.

Furthermore, our aim is to test a measure that is hardly influenced by managerial subjectivity. Most papers on the topic test for the cash flow part of earnings to compare it with accruals. In contrast, we want to use a measure that is independent of the specification of accruals, i.e. one that is *not* calculated as *a residual* of earnings less accruals. Also, we want it to be readily available to all investors directly from the income statement. Therefore we choose gross profits as our second explanatory variable. Its position high up in the income statement limits the influence that accounting practices have on it, although some room for discretion in revenue recognition and cost-matching stands in the way of complete objectivity.

In order to achieve comparability across different firm sizes and to focus on the *relative* performance across them, we normalize both measures with book value of total assets of the same year:

$$\frac{Accruals_t}{Avg\ Total\ Assets_t} \text{ and } \frac{Gross\ Profits_t}{Avg\ Total\ Assets_t}$$

Our observation period covers the years 1990 until 2010 to have an earlier part for which the accrual anomaly is still documented, and a later one for which there are indications of its disappearance (cf. e.g. Richardson et al. 2010), with a similar length for both. Further we had to consider that we would use the stock returns for up to three years after each time-point of measuring accounting data. In our regressions we then split this period into 1990-1999, and 2000-2010 to test for the aforementioned changes over time.

We obtained the necessary accounting data of US companies from the COMPUSTAT database for all companies in the New York Stock Exchange (NYSE) and NASDAQ. Financial firms are excluded due to high levels of leverage being a common characteristic among them, which normally is a sign of distress for non-financial firms (Fama and French, 1992). To calculate Annual Excess Returns we first downloaded Price Close - Annual - Fiscal (PRCC_F) from COMPUSTAT for each company and year. Since this is the closing price unadjusted for dividends and stock splits, we then obtained the Cumulative Adjustment Factor by Ex-Date - Fiscal (ADJEX_F) and combined it with PRCC_F to receive adjusted annual stock prices. Following the definition of excess stock returns we then calculated the difference in adjusted annual prices and subtracted the corresponding annual risk free rate to arrive at annual excess stock returns. We obtained the annual risk free rate by downloading the monthly risk free rate from the Fama and French Factor Data on CRSP, and then annualizing[3] it. For Gross Profits we used the COMPUSTAT item GP. For the calculation of the Accruals we used items Current Assets (ACT), Cash (CH), Current Liabilities (LCT), Debt in Current Liabilities (DLC), Taxes Payable (TXP) and Depreciation (DP). In order to calculate the Sales Growth we collected the item SALE. For Market Leverage we took the Long-Term Debt (DLTT) and divided it by the Market Capitalization, which we computed by multiplying the Common Shares Outstanding (CSHO) with the adjusted Price Close - Annual - Fiscal (PRCC_F). We downloaded the Betas for every company in every year of the chosen time-period directly from the CRSP database. We then linked each beta value to each company in a given year, using the Standard and

[3] $(1 + Avg\ R_f(monthly))^{12} - 1$

Poor's Identifier. To firms that delisted during our sample period, we assigned a stock returns of -100.0% in the year of delisting. Overall, this resulted in a final sample of 69,993 firm-year observations with the required financial data.

## 4. Data Integrity

After obtaining the necessary data we first conducted simple regressions with only accruals and gross profits respectively as explanatory variables and the beta as risk control. The output was characterized by very low coefficients of determination which made us reconsider the correctness of our data. Therefore our next step was the performance of a series of checks to ensure data integrity.

First we checked the data we had downloaded from COMPUSTAT and compared it to the annual reports of several companies for the given time period. For any randomly chosen company the data was accurate throughout all the years. We further conducted more analysis of related literature in order to obtain an appropriate adjusted R-squared value as orientation for our regressions. This turned out to be complicated because most researchers in this particular area do not publish the numbers for their coefficient of determination. A paper by Penman et al. (2007) shed some light on this issue and supported the validity of the low values for adjusted R-squared in our model. Similar to our model, Penman et al. (2007) used Fama and MacBeth (1973) regressions in their paper to explore how operating and financing components could influence stock returns of subsequent years. They obtained adjusted R-squared ranging from 0.004 to 0.037 which is in line with the ones for our regressions (between 0.006 and 0.012 in our base model). Although Richardson et al's. (2005) method is not directly comparable because they used OLS regressions, they nevertheless followed the Fama and MacBeth (1973) procedure and report similarly low adjusted R-squared in the range of 0.006 to 0.018.

Despite this, we further scrutinized our data. A possible explanation for a significant deviation in the model could be the beta. Therefore, we performed several regressions to attain the annual betas for companies such as Coca-Cola, Apple, Toyota and Tesla. We regressed weekly stock prices for these big companies against the MSCI World Index to get the annual beta for each company. The results significantly digressed from the data we had downloaded from the CRSP Database. However, substituting the beta values with our own obtained values resulted in an even poorer performance of the model, which led us to continue forth with the

CRSP data. We also applied a simplified control for company size by limiting the minimum amount of total assets of a company to 1 billion and 10 billion USD respectively, in case the basic relationship between our income measures and returns should be contingent on a minimum firm size. However, the improvement of determination coefficients was small and of no consequence.

During our chosen time period of 1990-2010 events such as the dot-com bubble or the global financial crisis took place, which could significantly influence the results of our model. We thus tested our model on a different time period from 1962-1970, the beginning of the periods used in Novy-Marx (2013) and Sloan (1996), but the output for the coefficient of determination was similarly low as for our actual period.

Furthermore, the possible existence of heteroscedasticity in our data was a concern in the application of our base model, which includes size as control in addition to beta, as it could invalidate the significance of our results. We performed the Breusch-Pagan Test, which showed us the presence of heteroscedasticity. To correct for this, variables that grow exponentially over time have to be logged as they often have increasing variability. In our case we logged the size control Total Assets, and thereby improved the results of our model noticeably.

## 5. Descriptive Statistics

Table 1 provides the basic descriptive statistics for an overview of the factors that drive the test results of our large and diverse sample.

For the selected items, mean, standard deviation and variation coefficient are reported as time series averages for the whole sample. We deleted extreme outliers from our sample to prevent them from biasing our measures.

Panel A includes the profitability measures whose prediction power we want to assess. Notably the mean of accruals is slightly negative with -3.45%. That of gross profits is clearly positive with 37.76%, as was expected from the position high up the income statement with only few deductions. The absolute value of the variation coefficient of accruals is about five times that of gross profits, which shows that the supposedly more subjective measure is relatively much more dispersed from the mean. This finding does not allow any conclusions about managerial discretion however, since it could indicate diverse accrual intensity stemming from different business models and stages in business cycles, just as well as many differing deliberate accounting choices across the sample firms.

Table 1 - Descriptive Statistics

| **Panel A: Profitability Measures** | **Mean** | **Std. Dev.** | **Variation Coefficient** |
|---|---|---|---|
| **Accruals / Avg Total Assets (t)** | -0,034 | 0,145 | -4,1940 |
| **Gross Profit / Avg Total Assets (t)** | 0,378 | 0,319 | 0,8448 |

| **Panel B: Accrual Components** | **Mean** | **Std. Dev.** | **Variation Coefficient** |
|---|---|---|---|
| **Current Assets** | 916 | 4116 | 4,4939 |
| **Cash** | 190 | 926 | 4,8751 |
| **Current Liabilities** | 680 | 3498 | 5,1454 |
| **Debt in Current Liabilities** | 140 | 1071 | 7,6469 |
| **Income Taxes Payable** | 34 | 262 | 7,6260 |
| **Depreciation and Amortization** | 144 | 815 | 5,6441 |

| **Panel C: Productive Capacity Measures** | **Mean** | **Std. Dev.** | **Variation Coefficient** |
|---|---|---|---|
| **Gross Profit** | 727 | 3303 | 4,5428 |
| **Sales Growth** | 0,100 | 31 | 315,34 |

| **Panel D: Risk Proxies** | **Mean** | **Std. Dev.** | **Variation Coefficient** |
|---|---|---|---|
| **Annual Beta** | 0,868 | 0,640 | 0,7376 |
| **ln (Total Assets)** | 5,833 | 2,055 | 0,3523 |
| **Market Leverage** | 0,402 | 3,355 | 8,3365 |

| **Panel E: Stock Returns** | **Mean** | **Std. Dev.** | **Variation Coefficient** |
|---|---|---|---|
| **Excess Annual Stock Return (t)** | 0,171 | 3,304 | 19,3075 |
| **Excess Annual Stock Return (t+1)** | 0,184 | 4,280 | 23,3219 |
| **Excess Annual Stock Return (t+2)** | 0,191 | 4,408 | 23,0220 |
| **Excess Annual Stock Return (t+3)** | 0,209 | 4,477 | 21,4185 |

Panel B reports the properties of the accrual components. According to the means, current assets with 916M USD and current liabilities with 680M USD are the largest accrual components, while income taxes payable with 34M USD is the smallest. Relative dispersion is especially high for debt in current liabilities and income taxes payable, while it is in comparison low for cash, which is surprising given the diverse business models our sample firms cover.

Panel C includes the measures gross profit and sales growth which are less affected by accounting subjectivity than accruals, and can be seen as proxies for current and future productive capacity of firms. The mean of gross profits is 727M USD and that of sales growth is 10.00%.

Panel D shows three factors that are widely accepted to systematically drive differences in future stock returns due to risk, namely market beta, size and market leverage (e.g. Fama and French, 1993). The mean of the annual beta is 0.87, which is close to 1 and hence indicates that most sample firms' stock returns are strongly correlated to market returns, i.e. the systematic risk part is high whereas the idiosyncratic part is low. Size, measured as the natural logarithm of total assets' book value, is characterized by a low variation coefficient of 0.35. For market leverage the variation coefficient is relatively high compared to the other two risk measures.

Panel E provides the statistics for annual stock returns in years t+1, t+2 and t+3 respectively following determination of the profitability measure in year t. The mean returns are between 17.1% and 21.0% and increase with longer time after t. This is merely a reflection of our approach to assign a return of -100.0% in the year in which a firm delists. For example for a firm that delists after only two years in the sample, the return of -100% will only show up in t and t+1, but not in t+2 and t+3 since there is no corresponding data for these years anymore, due to the delisting. Put more generally, the delisting return of -100.0% always influences returns in t and t+1, but in fewer cases influences returns in t+2 and in even fewer cases the returns in t+3.

Table 2 shows the Spearman rank (below diagonal) and Pearson (above diagonal) correlations among the dependent, independent and control variables employed in our Fama and MacBeth (1973) regressions.

Table 2

Correlation matrix—Pearson (above diagonal) and Spearman (below diagonal)

| **Variable** | **ExRet (t+1)** | **ExRet (t+2)** | **ExRet (t+3)** | **Accr (t)** | **GP (t)** | **Beta (t)** | **Ln (TA) (t)** | **Mark. Lev. (t)** | **Sales Gro. (t)** |
|---|---|---|---|---|---|---|---|---|---|
| **ExRet (t+1)** | | -0.0114 | -0.0068 | -0.0405 | -0.0139 | 0.0027 | -0.0332 | 0.3714 | -0.0004 |
| **ExRet (t+2)** | -0.1160 | | -0.0107 | -0.0144 | -0.0204 | 0.0007 | -0.0227 | 0.0596 | -0.0003 |
| **ExRet (t+3)** | -0.0788 | -0.0982 | | -0.0082 | -0.0144 | 0.0062 | -0.0152 | 0.0426 | -0.0002 |
| **Accruals (t)** | -0.0889 | -0.0738 | -0.0197 | | 0.0821 | 0.0602 | -0.0019 | -0.0183 | 0.0078 |
| **GP (t)** | -0.0047 | -0.0199 | -0.0144 | 0.1091 | | -0.0235 | -0.1129 | -0.0442 | -0.0089 |
| **Beta (t)** | -0.0418 | -0.0386 | 0.0059 | 0.0442 | -0.0310 | | 0.2219 | 0.0084 | 0.0017 |
| **Ln (TA) (t)** | -0.0280 | -0.0016 | 0.0405 | -0.0139 | -0.1851 | 0.2745 | | 0.0563 | -0.0073 |
| **Market Leverage (t)** | 0.0869 | 0.0706 | 0.0455 | -0.0918 | -0.3036 | -0.0658 | 0.3973 | | -0.0009 |
| **Sales Growth (t)** | -0.1259 | -0.0842 | -0.0233 | 0.2498 | 0.1370 | 0.0852 | -0.0401 | -0.1148 | |

Notably, the excess annual stock returns from year t+1 up to t+3 are all negatively related across each other. This suggests that on average over the whole sample period, a year of positive returns for a firm tends to be followed by one of negative returns for the same firm and vice versa. The risk proxies beta and size are strongly positively correlated, while their respective correlations with future stock returns are ambiguous. Spearman correlations between beta and returns start positive for year are negative for t+1 and t+2, but are negative for t+3 returns. Pearson correlations between beta and returns are slightly positive for all years. Similarly, according to Spearman rank size positively correlates with returns in t+3, and negatively for returns in t+1 and t+2, while the Pearson correlation is negative for all years. The signs of correlation of market leverage with future returns mirror those of sales growth and future returns. Returns in the same year are negatively related to market leverage and positively to sales growth, whereas future returns are positively related to current market leverage and negatively to current sales growth. Overall, all control variables seem suitable since they have distinct correlations to the dependent future returns variables, and to at least one of the independent variables accruals and gross profits. Only for sales growth the Pearson correlations with stock returns seems too low, but on the other hand, Spearman rank indicates sufficiently pronounced correlations.

Future stock returns in t+1, t+2 and t+3 are all negatively correlated to accruals in year t. For gross profits in year t correlations with future stock returns are also negative, with the exception of the Spearman correlation with returns in t+1. These correlations indicate that not only a higher accrual part of earnings, but also higher gross profits correlate with lower excess stock returns in the following three years. Accruals and gross profits are positively correlated, as can be expected for two measures related to profitability.

# 6. Results

## *6.1 Base Model Accruals*

The first part of the research question asks for the predictive power of accruals for future excess stock returns. To assess this relation the Fama and MacBeth (1973) method is used. As Sloan (1996) does, we examine annual excess stock returns for the three subsequent years after accrual measurement. The Capital Asset Pricing Model beta is used to control for the systematic risk stemming from the individual stock's co-movement with the market. We also use firm size as control variable, because our dataset includes a wide range of firm sizes and stock returns are shown to be strongly related to size (e.g. Fama and French, 1993). In contrast to Sloan (1996) who uses market capitalization, we use the natural logarithm of total assets as proxy for size, because it is less volatile over time and not as directly influenced by busts on the stock market, which is especially important for the period 2000-2010. The logarithm is used because the distribution of total assets is approximately exponential over the chosen time period, but has to be roughly linear to be consistent with the rest of the model. Problematic is that total assets are already used to normalize our accrual and gross profit measures, so that any change in total assets will influence the denominator of our independent variable in a way that flattens the correlation. We considered this issue as possible reason for the low accrual-size correlations (-0.002 Pearson; -0.015 Spearman). However, correlations between gross profits and size are much more pronounced (-0.113 Pearson; -0.185 Spearman), so we conclude that the standardization cannot be the decisive factor for the low accrual-size correlation and we therefore deem the log of total assets a suitable control variable.

Consequently, we run regressions with the following specification for the whole sample, for each year individually:

$$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon \quad (1)$$

| | |
|---|---|
| t | Observation year |
| τ | Years 1 to 3 after observation year t |
| $R^e$ | Annual stock returns in excess of annual risk free rate |
| ACCR | Accruals normalized by total assets |
| BETA | CAPM Beta |
| SIZE | Natural logarithm of book value of total assets: ln(TotalAssets) |
| α | Intercept |
| γ | Coefficients of the respective independent variables |
| ε | Error term |

Table 3 reports the time series means of intercepts, coefficients, P-values, and adjusted R-squared for the entire observation period.

Table 3
Fama and MacBeth regressions on model (1), Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.0993 | -0.2343 | -0.3735 | **P > t Accrual** | 0.0320 | 0.5030 | 0.0000 |
| **Beta Coeff.** | 0.0991 | 0.1174 | 0.0624 | **P > t Beta** | 0.3230 | 0.0810 | 0.2080 |
| **Ln (TA) Coeff.** | -0.0842 | -0.0684 | -0.0468 | **P > t LN (TA)** | 0.0010 | 0.0070 | 0.0210 |
| **Intercept** | 0.5175 | 0.4773 | 0.4040 | **Adjusted R2** | 0.0102 | 0.0075 | 0.0065 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

For stock returns of t+1 the coefficient of accruals is negative with -1.10 and statistically significant on a five percent level. With stock returns in t+2 as independent variable, the accruals coefficient is not significant. For t+3 it is significant and negative again (-0.37), but much less pronounced than for t+1. Intercepts are 0.52, 0.48 and 0.40 respectively for regressions with stock returns in t+1, t+2 and t+3 as independent variable. This means that about 50% of returns in the first two years, and 40% in the third year are not explained by the model.

For the whole period of 1990-2010 we find the beta as chosen risk proxy to be statistically insignificant for all future return years. This is in line with Fama and French's (1992) research where they show that the positive relation between beta and average returns weakened considerably or even disappeared during the period of 1963-1990.

In contrast, the natural logarithm of total assets is highly significant and negatively related to all three future years' returns, which is an indication that total assets can be used in addition to accruals for the prediction of excess returns. However, the time split reveals that size is only significant for the period 1990-1999, but not for 2000-2010. For t+1 returns in the latter the size coefficient is on the verge of significance with P-values of 0.052, but decreases into clear insignificance for t+2 and t+3 returns.

The adjusted R-squared is low between 0.0065 and 0.0102 and decreasing with increasing time difference between stock returns and point of accrual measurement.

Because there is previous research suggesting the disappearance of the predictive power of accruals starting approximately in the year 2000 (Green et al., 2011; Richardson et al., 2010), we divide our observation period into before and after this alleged disappearance, i.e. into 1990-1999 and 2000-2010.

Table 4

Panel A

Fama and MacBeth regressions on model (1), Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.8761 | -0.8128 | -0.4355 | **P > t Accrual** | 0.0010 | 0.0090 | 0.0270 |
| **Beta Coeff.** | 0.0218 | 0.0756 | 0.0509 | **P > t Beta** | 0.5880 | 0.4730 | 0.5690 |
| **Ln (TA) Coeff.** | -0.0971 | -0.0815 | -0.0637 | **P > t LN (TA)** | 0.0040 | 0.0160 | 0.0240 |
| **Intercept** | 0.6242 | 0.5101 | 0.4089 | **Adjusted R2** | 0.0117 | 0.0070 | 0.0064 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

Panel B

Fama and MacBeth regressions on model (1), Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.3022 | 0.2916 | -0.3171 | **P > t Accrual** | 0.1830 | 0.6270 | 0.0040 |
| **Beta Coeff.** | 0.1694 | 0.1555 | 0.0727 | **P > t Beta** | 0.3800 | 0.0900 | 0.1850 |
| **Ln (TA) Coeff.** | -0.0724 | -0.0564 | -0.0314 | **P > t LN (TA)** | 0.0520 | 0.1540 | 0.3000 |
| **Intercept** | 0.4205 | 0.4475 | 0.3995 | **Adjusted R2** | 0.0089 | 0.0079 | 0.0067 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

The results for the earlier period are reported in Table 4, Panel A. For stock returns in t+1 and t+2 the coefficient of accruals is strongly negative (-0.88 and -0.81) and statistically significant. For returns in t+3 it amounts to only about half the value (-0.44) of the two years before, but is also significant. Intercepts exhibit the same decreasing pattern as for the entire period, but are considerably higher in this early period for the t+1 return regression (0.62 compared to 0.52).

Table 4, Panel B provides the results for the more current period. Especially noteworthy is that the coefficient of accruals is statistically insignificant for the specification with excess returns in t+1 and t+2 for this period. For the t+3 regression it is clearly significant and moderately negative (-0.32). In the period starting in year 2000, the P-values of beta coefficients are notably lower than for the previous period (0.21 to 0.38 lower depending on time point of returns) and the coefficients are notably higher.

Furthermore, the intercepts for the t+1 and t+2 specifications are much lower for the later period, than for the period 1990-1999, and there is no consistent pattern of decrease with increasing time difference to the date of accrual measurement. To identify the reasons behind this change, we firstly regress returns only on accruals as independent variable (see Table 5). Secondly, we only use beta and size regressors (for detailed results see Appendix A1). The relative changes[4] of intercepts between periods when regressing returns only on accruals are all positive and range from 32.03% for t+1, to 156.57% for t+3. When regressing returns only on beta and size together, the relative inter-period changes in intercepts are negative for t+1 (-07.34%) and t+2 (-19.11%), and moderately positive for t+3 (9.93%). Hence, the proportion of returns that is explained by accruals has declined dramatically from the first period to the second, while beta and size capture slightly more of t+1 and t+2 returns, but less for t+3.

Table 5
Panel A
Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.9354 | -0.7604 | -0.3670 | **P > t Accrual** | 0.0000 | 0.0060 | 0.0820 |
| **Intercept** | 0.1230 | 0.1202 | 0.1064 | **Adjusted R2** | 0.0022 | 0.0016 | 0.0001 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \varepsilon$

Panel B
Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.3149 | 0.2276 | -0.3072 | **P > t Accrual** | 0.1690 | 0.7050 | 0.0010 |
| **Intercept** | 0.1624 | 0.2545 | 0.2730 | **Adjusted R2** | 0.0016 | 0.0000 | 0.0000 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \varepsilon$

### *6.2 Base Model Gross Profits*

The second part of the research question addresses the predictive power of gross profits for future excess stock returns. The corresponding regression specification with gross profits normalized by total assets as independent variable, and with the same dependent variable and control variables as for the specification (1), is:

$$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon \quad (2)$$

| | |
|---|---|
| t | Observation year |
| τ | Years 1 to 3 after observation year t |
| $R^e$ | Annual stock returns in excess of annual risk free rate |
| GP | Gross Profits normalized by total assets |
| BETA | CAPM Beta |
| SIZE | Natural logarithm of book value of total assets: ln(TotalAssets) |
| α | Intercept |
| γ | Coefficients of the respective independent variables |
| ε | Error term |

[4] Calculated as $Relative\ Change = \frac{\text{Value Later Period}}{\text{Value Earlier Period}} - 1$

Table 6 reports the means for coefficients, intercepts, P-value results and adjusted R-squared over the entire period from 1990-2010. Again, we divide the observation period into 1990-1999 and 2000-2010, to enable a comparison of time consistency between accruals and gross profits.

Table 6

Fama and MacBeth regressions on model (2), Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.2192 | -0.3018 | -0.2572 | **P > t GP** | 0.0020 | 0.0020 | 0.0110 |
| **Beta Coeff.** | 0.0901 | 0.1050 | 0.0590 | **P > t Beta** | 0.3660 | 0.1090 | 0.2430 |
| **Ln (TA) Coeff.** | -0.0927 | -0.0709 | -0.0499 | **P > t LN (TA)** | 0.0000 | 0.0060 | 0.0160 |
| **Intercept** | 0.7148 | 0.6157 | 0.5382 | **Adjusted R2** | 0.0089 | 0.0070 | 0.0070 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

The coefficients for gross profits are moderately negative for each return variable t+1, t+2 and t+3 for the observation period as a whole (-0.22; -0.30 and -0.26), as well as for both individual parts. These results contrast the finding of Novy-Marx (2013) that excess stock returns are positively related to gross profits.

There is a higher proportion of returns unexplained by the gross profit specification as compared to the accrual specification, as shown by the higher intercepts ranging from 0.54 to 0.71 as compared to 0.40 to 0.52. The same can be observed after breaking the data into two time periods as shown in Table 7. The values for the intercepts are considerably higher in the earlier period than in the later one. In the first they range from 0.56 to 0.75, and in the latter from 0.52 to 0.68, which indicates an increase in explanatory value of the gross profits model for the later period. In both cases the intercept value decreases over time. The most likely explanation for this behavior is that in the short term a larger variety of non-fundamental factors, also called noise (e.g. Black, 1986), influences stock prices. Adjusted R-squared is on a similar level below 0.0100 for both periods.

Table 7

Panel A

Fama and MacBeth regressions on model (2), Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.1907 | -0.2441 | -0.2829 | **P > t GP** | 0.0320 | 0.0240 | 0.0490 |
| **Beta Coeff.** | 0.0112 | 0.0679 | 0.0560 | **P > t Beta** | 0.7840 | 0.4940 | 0.5640 |
| **Ln (TA) Coeff.** | -0.0994 | -0.0843 | -0.0680 | **P > t LN (TA)** | 0.0040 | 0.0160 | 0.0250 |
| **Intercept** | 0.7503 | 0.6529 | 0.5589 | **Adjusted R2** | 0.0095 | 0.0065 | 0.0058 |

$R_{t+\tau}^{e} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

Panel B

Fama and MacBeth regressions on model (2), Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.2452 | -0.3543 | -0.2339 | **P > t GP** | 0.0270 | 0.0280 | 0.1240 |
| **Beta Coeff.** | 0.1619 | 0.1388 | 0.0616 | **P > t Beta** | 0.3980 | 0.1330 | 0.1930 |
| **Ln (TA) Coeff.** | -0.0865 | -0.0587 | -0.0335 | **P > t LN (TA)** | 0.0280 | 0.1390 | 0.2590 |
| **Intercept** | 0.6826 | 0.5819 | 0.5194 | **Adjusted R2** | 0.0084 | 0.0075 | 0.0080 |

$R_{t+\tau}^{e} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

To obtain results better comparable to those of Novy-Marx (2013), we further perform a regression with excess annual stock returns in year t as dependent variable on our gross profits measure in the same year t (see Table 8). Again we control for size and beta. In contrast to our regressions with *future* returns, we now receive a positive coefficient for gross profits. It is significant on a five percent level but has a rather low value (0.11).

Table 8

Fama and MacBeth regressions, Years 1990-2010, Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | **Significance** | |
|---|---|---|---|
| | **t** | | **t** |
| **GP Coeff.** | 0.1054 | **P > t GP** | 0.0320 |
| **Beta Coeff.** | 0.0637 | **P > t Beta** | 0.3870 |
| **Ln (TA) Coeff.** | -0.0612 | **P > t LN (TA)** | 0.0070 |
| **Intercept** | 0.5103 | **Adjusted R2** | 0.0012 |

$R_{t}^{e} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

*6.3 Accruals and Gross Profits in Combination*

As a next step we combine the initial models of (1) and (2) in order to see whether our two independent variables complement or interfere with each other. The specification is shown in (3):

$$R^{e}_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 GP_t + \gamma_3 BETA_t + \gamma_4 SIZE_t + \varepsilon \quad (3)$$

| | |
|---|---|
| t | Observation year |
| τ | Years 1 to 3 after observation year t |
| $R^e$ | Annual stock returns in excess of annual risk free rate |
| ACCR | Accruals normalized by total assets |
| GP | Gross Profits normalized by total assets |
| BETA | CAPM Beta |
| SIZE | Natural logarithm of book value of total assets: ln(Total Assets) |
| α | Intercept |
| γ | Coefficients of the respective independent variables |
| ε | Error term |

The results of the regression for (3) are presented in *Appendix A2*. Combining these two variables does not generate any important changes. The coefficients of both independent variables become slightly less negative (e.g. accruals from -1.10 to -1.08; gross profits from -0.22 to -0.17 for t+1 returns), indicating that there is some interference, albeit weak. The P-value for both increases slightly. With values from 0.0090 to 0.0120 the determination coefficient reaches a higher range compared to models (1) and (2), which is an indication of improved fit of the linear model with combined explanatory variables. Intercepts decrease slightly, because of the increased overall explanatory power that is due to including an additional independent variable.

*6.4 Controlling for Industries*

Accruals and gross profits are both sensitive to business models (e.g. Arif et al., 2014). For example firms that pay suppliers quickly but receive cash for their final product from customers with a long time lag, will have high current assets relative to current liabilities and hence high accruals. Firms that can achieve high gross margins, for example due to a strong brand, will obviously have high gross profitability. Additionally, the asset-intensity of an industry affects our explanatory variables, because we standardize them with the book value of total assets.

For these reasons we also run our base model with nine added industry dummy variables as controls. We assign each company to a single industry based on its SIC code. We exclude manufacturing as the base case, because it is by far the largest industry in our sample. Table 9 summarizes the slightly different test results from our base case, as well as the P-values of the industry dummies. The latter show insignificance for all industries. This implies that belonging to a certain industry does not have relevant prediction power in addition to accruals or gross profits. The split in two time periods for accruals as well as for gross profits can be found in *Appendix A3* and *A4* respectively. Because there is a potential bias stemming from the dot-com bubble that started in the mid-nineties, in the next step we then also exclude the firms from the IT industry, which is a subcategory of Services. The results are provided in *Appendix A5*. The most notable change in results is that the accrual coefficient for t+1 returns is no longer significant on a five percent level.

Table 9

Panel A

Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.0657 | -0.1906 | -0.3292 | **P > t Accrual** | 0.0370 | 0.5990 | 0.0020 |
| **Beta Coeff.** | 0.1120 | 0.1276 | 0.0794 | **P > t Beta** | 0.2970 | 0.0620 | 0.1130 |
| **Ln (TA) Coeff.** | -0.0921 | -0.0768 | -0.0532 | **P > t LN (TA)** | 0.0000 | 0.0020 | 0.0010 |
| **Intercept** | 0.5358 | 0.4898 | 0.4004 | **Adjusted R2** | 0.0162 | 0.0137 | 0.0113 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.4690 | 0.6760 | 0.6990 |
| **Mining** | 0.3580 | 0.0930 | 0.2380 |
| **Construction** | 0.7640 | 0.6650 | 0.5880 |
| **Transportation, Communications, Electric, Gas & Sanitary Services** | 0.1800 | 0.1850 | 0.2760 |
| **Wholesale Trade** | 0.1800 | 0.1330 | 0.1100 |
| **Retail Trade** | 0.7640 | 0.7220 | 0.6690 |
| **Real Estate** | 0.8970 | 0.4940 | 0.4660 |
| **Services** | 0.4040 | 0.9420 | 0.4770 |
| **Public Administration** | 0.1950 | 0.3290 | 0.3290 |

$$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$$

Panel B

Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.1924 | -0.2742 | -0.2305 | **P > t GP** | 0.0050 | 0.0020 | 0.0150 |
| **Beta Coeff.** | 0.1005 | 0.1125 | 0.0740 | **P > t Beta** | 0.3470 | 0.0930 | 0.1360 |
| **Ln (TA) Coeff.** | -0.0994 | -0.0766 | -0.0541 | **P > t LN (TA)** | 0.0000 | 0.0020 | 0.0010 |
| **Intercept** | 0.7090 | 0.5967 | 0.5090 | **Adjusted R2** | 0.0139 | 0.0122 | 0.0133 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.3630 | 0.5610 | 0.5420 |
| **Mining** | 0.3130 | 0.1650 | 0.3540 |
| **Construction** | 0.9550 | 0.8570 | 0.7300 |
| **Transportation, Communications, Electric, Gas & Sanitary Services** | 0.2220 | 0.2380 | 0.3800 |
| **Wholesale Trade** | 0.0990 | 0.2040 | 0.1050 |
| **Retail Trade** | 0.1840 | 0.0290 | 0.2140 |
| **Real Estate** | 0.8070 | 0.6060 | 0.5480 |
| **Services** | 0.9390 | 0.4980 | 0.2530 |
| **Public Administration** | 0.2150 | 0.3290 | 0.3290 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

### *6.5 Size Extremes*

To account for the possibility that either of the two relations we are trying to assess, is more pronounced for firms with very high or low size, we group firms in every year into the top and bottom ten percent of book value of total assets. We do the same for market capitalization, based on stock price and outstanding shares at every year end.

Because size is now already sufficiently captured by the grouping and cut-off of our data, we drop the control variable for size, the natural logarithm of total assets, from our regression specifications:

$$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \varepsilon$$

$$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \varepsilon$$

Table 10

Panel A

Fama and MacBeth regressions, Years 1990-2010, Top 10% Total Assets

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.4065 | -1.2438 | -1.0533 | **P > t Accrual** | 0.1000 | 0.2170 | 0.3130 |
| **Beta Coeff.** | 0.2275 | 0.2683 | 0.1427 | **P > t Beta** | 0.2890 | 0.1860 | 0.1870 |
| **Intercept** | -0.2159 | -0.2092 | -0.0492 | **Adjusted R2** | 0.0017 | 0.0007 | 0.0007 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 1990-2010, Bottom 10% Total Assets

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.1562 | -0.7421 | -0.8215 | **P > t Accrual** | 0.7480 | 0.5920 | 0.0220 |
| **Beta Coeff.** | 0.5897 | 0.1801 | -0.2182 | **P > t Beta** | 0.3070 | 0.4070 | 0.4830 |
| **Intercept** | 0.8048 | 0.8124 | 0.7960 | **Adjusted R2** | 0.0006 | 0.0000 | 0.0006 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \varepsilon$

Results for grouping according to total assets are reported in Table 10. While most shown coefficients for accruals are even more negative for top and bottom groups compared to the entire sample, they are not significantly different from zero, with the exception of the t+3 return specification for the bottom group.

For gross profits as independent variable we receive a similar picture (see Appendix A6), with coefficients of both groups being even more negative than for the entire sample, but lacking statistical significance with exception of only the t+2 return specification of the bottom group.

As a second step we conduct regressions for the top and bottom ten percent companies in terms of market capitalization (Appendix A7). As with the total asset size extremes, we find significance in almost none of the results. However, it should be noted that the coefficients for the accrual variable change extremely for the bottom ten percent of market capitalization, reaching -2.73 for t+1, and in sharp contrast 8.36 for t+2 returns. Gross profits follow the same trend of insignificance as in the grouping according to book value of total assets.

### *6.6 Normalizing with Lagged Total Assets*

As Fairfield et al. (2003b) point out, the normalized accrual measure of Sloan (1996) that is also used in this thesis, suffers from the problem that changes in accruals are directly related to changes in total assets in the same year. Therefore, an increase in the accrual part of earnings in the numerator will entail an increase in total assets in the denominator. This results in size changes absorbing part of the changes of the independent variable accruals, and can be an explanation for why our size control variable has significant additional explanatory power for future stock returns.

To avoid this direct correlation we use an average of lagged total assets in the denominator of our accrual measure:

$$ACCR_{t-1} = \frac{Accruals_t}{Avg\ Total\ Assets_{t-1}{}^{5}}$$

and use this definition as independent variable in regression specification (3).

Table 11 shows the mean results of these regressions. The accrual coefficient is now insignificant for returns in t+1 and t+2, yet negative and significant for returns in t+3. The natural logarithm of total assets still has a significant negative correlation to returns in all three following years. Adjusted R-squared is extremely low at 0.0000, implying a non-existent linear fit of the model.

Table 11

Fama and MacBeth regressions, Years 1990-2010, Accruals (t-1), 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual (t-1) Coeff.** | -0.6015 | -0.1802 | -0.1308 | **P > t Accrual** | 0.0850 | 0.2040 | 0.0010 |
| **Beta Coeff.** | 0.1056 | 0.1309 | 0.0441 | **P > t Beta** | 0.3020 | 0.0820 | 0.2530 |
| **Ln (TA) Coeff.** | -0.0889 | -0.0716 | -0.0404 | **P > t Ln (TA)** | 0.0010 | 0.0070 | 0.0400 |
| **Intercept** | 0.5736 | 0.4914 | 0.3800 | **Adjusted R2** | 0.0000 | 0.0000 | 0.0000 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_{t-1} + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

For the gross profitability measure there is no direct relationship between numerator and denominator, because gross profits have a large cash flow component of which only a small proportion affects total assets on the balance sheet. Nevertheless, we also test specification (4) with gross profits defined as:

$$GP_{t-1} = \frac{Gross\ Profit_t}{Avg\ Total\ Assets_{t-1}{}^{6}}$$

[5] $Avg.Total\ Assets_{t-1} = \frac{Total\ Assets_{OB\ t-1} + Total\ Assets_{CB\ t-1}}{2}$

[6] See 5.

Table 12

Fama and MacBeth regressions, Years 1990-2010, Gross Profit (t-1), 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP (t-1) Coeff.** | -0.2528 | -0.3229 | -0.1879 | **P > t Accrual** | 0.0020 | 0.0000 | 0.0030 |
| **Beta Coeff.** | 0.1059 | 0.1330 | 0.0438 | **P > t Beta** | 0.2930 | 0.0810 | 0.2670 |
| **Ln (TA) Coeff.** | -0.0946 | -0.0758 | -0.0430 | **P > t Ln (TA)** | 0.0000 | 0.0050 | 0.0290 |
| **Intercept** | 0.7457 | 0.6590 | 0.4810 | **Adjusted R2** | 0.0000 | 0.0000 | 0.0000 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_{t-1} + \gamma_2 BETA_t + \gamma_3 SIZE_t + \varepsilon$

Results are reported in Table 12. Gross profitability as return predictor is negative and highly significant at a one percent level. Here too, the size control still has additional explanatory power for future returns, and the determination coefficient is 0.0000.

### *6.7 Adding Control for Market Leverage*

The effect of market leverage, defined as the market value of total debt divided by market capitalization, on stock returns is controversial among researchers. Amongst others, Fama and French (1992) find it to be positively related to returns, while for example Penman et al. (2007) report a negative relationship. For our analysis we assume the notion of Fama and French (1992) that market leverage is a risk factor and therefore requires higher returns as compensation. Hence, we add market leverage as additional control for risk to our base models (3) and (4). We use the book value of total debt under the assumption that it is a close approximation of the market value of total debt, and divide it by market capitalization. A direct relation between this form of leverage and accruals or gross profits is not obvious. We include it as a general risk control that could strengthen the case for a risk-based explanation of returns as alternative to our income-based variables.

Table 13
Panel A
Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.0221 | -0.2943 | -0.2056 | **P > t Accrual** | 0.0370 | 0.2960 | 0.2010 |
| **Beta Coeff.** | 0.0727 | 0.1044 | 0.1324 | **P > t Beta** | 0.2560 | 0.0660 | 0.0850 |
| **Ln (TA) Coeff.** | -0.1057 | -0.1175 | -0.1219 | **P > t LN (TA)** | 0.0000 | 0.0040 | 0.0220 |
| **Leverage Coeff.** | 0.1794 | 0.6824 | 1.2450 | **P > t Leverage** | 0.0000 | 0.2410 | 0.2520 |
| **Intercept** | 0.5900 | 0.5921 | 0.5011 | **Adjusted R2** | 0.1370 | 0.0040 | 0.0019 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \varepsilon$

Panel B
Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.1254 | -0.1099 | 0.0649 | **P > t GP** | 0.0290 | 0.3590 | 0.7780 |
| **Beta Coeff.** | 0.0649 | 0.0944 | 0.1357 | **P > t Beta** | 0.3140 | 0.0860 | 0.1020 |
| **Ln (TA) Coeff.** | -0.1127 | -0.1185 | -0.1230 | **P > t LN (TA)** | 0.0000 | 0.0040 | 0.0200 |
| **Leverage Coeff.** | 0.1782 | 0.6814 | 1.2564 | **P > t Leverage** | 0.0000 | 0.2430 | 0.2540 |
| **Intercept** | 0.7390 | 0.6537 | 0.4897 | **Adjusted R2** | 0.1372 | 0.0040 | 0.0019 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \varepsilon$

Table 13 provides the regression results. The inclusion of market leverage in the specification with accruals, changes the accrual coefficient which was significant for t+3 returns in the base model, into statistical insignificance. Gross profits become insignificant as predictor for t+2 and t+3 returns, when in the base model they were highly significant for both. Market leverage has a moderately positive (0.18) highly significant relation to t+1 stock returns. Also, the inclusion of market leverage drastically improves the determination coefficient from around 0.0100 percent in the base model to now almost 0.1400. However, for returns two and three years after measurement, market leverage is not a significant predictor and does not improve adjusted R-squared. Nevertheless, it is exactly these returns years in which it absorbs a large part of predictive power of each of our two income statement-based independent variables for exactly these return years. Intercepts for all three return years are notably higher in the accrual specification with the leverage control than in the one without, which could imply a larger portion of unexplained returns in the former.

Here a distinction between the periods 1990-1999 and 2000-2010 for the regression with accruals shows large differences over time (see Table 14).

Table 14

Panel A

Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.8244 | -0.7552 | -0.3877 | **P > t Accrual** | 0.0010 | 0.0150 | 0.0370 |
| **Beta Coeff.** | 0.0370 | 0.1026 | 0.0734 | **P > t Beta** | 0.3800 | 0.3450 | 0.3990 |
| **Ln (TA) Coeff.** | -0.1065 | -0.0933 | -0.0740 | **P > t LN (TA)** | 0.0030 | 0.0080 | 0.0090 |
| **Leverage Coeff.** | 0.1337 | 0.1559 | 0.1445 | **P > t Leverage** | 0.0000 | 0.0160 | 0.0430 |
| **Intercept** | 0.6070 | 0.4970 | 0.3934 | **Adjusted R2** | 0.0114 | 0.0069 | 0.0043 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.2019 | 0.1248 | -0.0402 | **P > t Accrual** | 0.1980 | 0.7840 | 0.8780 |
| **Beta Coeff.** | 0.1052 | 0.1059 | 0.1862 | **P > t Beta** | 0.3800 | 0.0460 | 0.1470 |
| **Ln (TA) Coeff.** | -0.1050 | -0.1395 | -0.1655 | **P > t LN (TA)** | 0.0110 | 0.0570 | 0.0980 |
| **Leverage Coeff.** | 0.2209 | 1.1610 | 2.2453 | **P > t Leverage** | 0.0020 | 0.3060 | 0.2890 |
| **Intercept** | 0.5745 | 0.6785 | 0.5990 | **Adjusted R2** | 0.1745 | 0.0042 | 0.0020 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \varepsilon$

For the first period results are consistent with those of the base model. In the second period however, accruals are not significant for the prediction of any return year, while in the base case they were highly significant for t+3 returns. Moreover, market leverage is significant for all return years in the first period, but only for next year’s returns in the second period. Also the relatively high determination coefficient for t+1 returns is solely driven by the high value from years 2000-2010.

The gross profits coefficients are consistently insignificant for both periods (tables in Appendix A8).

### *6.8 Adding Control for Sales Growth*

To test for the hypothesis of an extrapolation growth bias, we extend our base models (3) and (4) by adding sales growth as control variable. Top line growth can be seen as common basis for all types of firm growth, so that using this variable is a powerful control for growth in a broad sense. If the forecasting of current growth levels too far into the future was the underlying reason for the accrual-return or gross profit-return relation, then the significance of accrual or gross profit coefficients should decline with the inclusion of a growth proxy in the regression.

Table 15
Panel A
Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **Accrual Coeff.** | -1.1671 | -0.1556 | -0.3178 | **P > t Accrual** | 0.0450 | 0.6820 | 0.0010 |
| **Beta Coeff.** | 0.0927 | 0.1309 | 0.0704 | **P > t Beta** | 0.3800 | 0.0670 | 0.1730 |
| **Ln (TA) Coeff.** | -0.0634 | -0.0677 | -0.0454 | **P > t LN (TA)** | 0.0020 | 0.0130 | 0.0350 |
| **Sales Gro Coeff.** | -0.0026 | -0.0123 | 0.0056 | **P > t Sales Gro** | 0.4510 | 0.1460 | 0.5350 |
| **Intercept** | 0.3815 | 0.4641 | 0.3848 | **Adjusted R2** | 0.0023 | 0.0001 | 0.0001 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 SALGR_t + \varepsilon$

Panel B
Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **GP Coeff.** | -0.1814 | -0.3005 | -0.2490 | **P > t GP** | 0.0040 | 0.0030 | 0.0260 |
| **Beta Coeff.** | 0.0848 | 0.1167 | 0.0677 | **P > t Beta** | 0.4230 | 0.0940 | 0.2070 |
| **Ln (TA) Coeff.** | -0.0719 | -0.0703 | -0.0491 | **P > t LN (TA)** | 0.0010 | 0.0110 | 0.0270 |
| **Sales Gro Coeff.** | -0.0041 | -0.0162 | 0.0016 | **P > t Sales Gro** | 0.1800 | 0.0660 | 0.8200 |
| **Intercept** | 0.5687 | 0.6019 | 0.5192 | **Adjusted R2** | 0.0006 | 0.0001 | 0.0004 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 SALGR_t + \varepsilon$

The results are shown in Table 15 for accruals and for gross profits.The change in coefficient of the respective independent variable is marginal, and does not change the qualitative analysis since the signs are unchanged. Coefficients of the sales growth control do not show any relevant additional prediction power for returns, because none of them are significant on a five percent level. Intercepts decrease by up to 15.00%, so a larger part of returns is accounted for than in our base models.

### *6.9 Extended Model*

When controlling for beta, size, market leverage and sales growth together, statistical significance of the average negative accrual-return relation over the whole period only stays intact for next year's returns, and barely at that (see Table 16, Panel A). In the period 1990-1999 it is evident for t+1 and t+2 returns, whereas for the period 2000-2010 it disappears completely (see Appendix A9).

Gross profitability in our extended model does not achieve significant prediction power in any return year, neither over the entire period (see Table 16, Panel B) nor over one individually (see Appendix A10).

Table 16

Panel A

Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| Independent Variables | t+1 | t+2 | t+3 | Significance | t+1 | t+2 | t+3 |
|---|---|---|---|---|---|---|---|
| **Accrual Coeff.** | -1.0925 | -0.2397 | -0.1326 | **P > t Accrual** | 0.0500 | 0.4160 | 0.4490 |
| **Beta Coeff.** | 0.0633 | 0.1149 | 0.1418 | **P > t Beta** | 0.3500 | 0.0530 | 0.0810 |
| **Ln (TA) Coeff.** | -0.0849 | -0.1182 | -0.1226 | **P > t LN (TA)** | 0.0000 | 0.0060 | 0.0270 |
| **Leverage Coeff.** | 0.1744 | 0.7128 | 1.2960 | **P > t Leverage** | 0.0000 | 0.2440 | 0.2570 |
| **Sales Gro Coeff.** | -0.0029 | -0.0071 | 0.0056 | **P > t Sales Gro** | 0.4240 | 0.2860 | 0.5580 |
| **Intercept** | 0.4600 | 0.5805 | 0.4862 | **Adjusted R2** | 0.1469 | 0.0040 | 0.0019 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \gamma_5 SALGR_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 1990-2010, 69,993 firm-year observations

| Independent Variables | t+1 | t+2 | t+3 | Significance | t+1 | t+2 | t+3 |
|---|---|---|---|---|---|---|---|
| **GP Coeff.** | -0.0858 | -0.0849 | 0.1014 | **P > t GP** | 0.0760 | 0.5430 | 0.6930 |
| **Beta Coeff.** | 0.0573 | 0.1035 | 0.1478 | **P > t Beta** | 0.4090 | 0.0730 | 0.0960 |
| **Ln (TA) Coeff.** | -0.0917 | -0.1186 | -0.1236 | **P > t LN (TA)** | 0.0000 | 0.0050 | 0.0240 |
| **Leverage Coeff.** | 0.1746 | 0.7122 | 1.3092 | **P > t Leverage** | 0.0000 | 0.2460 | 0.2590 |
| **Sales Gro Coeff.** | -0.0039 | -0.0093 | 0.0046 | **P > t Sales Gro** | 0.2220 | 0.2070 | 0.5260 |
| **Intercept** | 0.5960 | 0.6266 | 0.4550 | **Adjusted R2** | 0.1458 | 0.0040 | 0.0019 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \gamma_5 SALGR_t + \varepsilon$

# 7. Discussion

To facilitate the understanding of this discussion section, Table 17 provides an overview of results for our different regression specifications of next year's returns over the entire observation period 1990-2010. P-test results for P>|t| are reported in brackets.

Table 17

Fama and MacBeth regression models t+1, Years 1990-2010, 69,993 firm-year observations

| | I | II | III | IV | V | VI | VII | VIII | IX |
|---|---|---|---|---|---|---|---|---|---|
| **Intercept** | 0.5175 | 0.7148 | 0.6010 | 0.5900 | 0.7390 | 0.3815 | 0.5687 | 0.4600 | 0.5960 |
| | [0.0090] | [0.0010] | [0.0070] | [0.0010] | [0.0000] | [0.0300] | [0.0010] | [0.0020] | [0.0020] |
| **Accrual** | -1.0993 | | -1.0784 | -1.0221 | | -1.1671 | | -1.0925 | |
| | [0.0320] | | [0.0350] | [0.0370] | | [0.0450] | | [0.0500] | |
| **GP** | | -0.2192 | -0.1682 | | -0.1254 | | -0.1814 | | -0.0858 |
| | | [0.002] | [0.0080] | | [0.0290] | | [0.0040] | | [0.0760] |
| **Beta** | 0.0991 | 0.0901 | 0.1007 | 0.0727 | 0.0649 | 0.0927 | 0.0848 | 0.0633 | 0.0573 |
| | [0.3230] | [0.3660] | [0.3140] | [0.2560] | [0.3140] | [0.3800] | [0.4230] | [0.3500] | [0.4090] |
| **Ln (TA)** | -0.0842 | -0.0927 | -0.0876 | -0.1057 | -0.1127 | -0.0634 | -0.0719 | -0.0849 | -0.0917 |
| | [0.0010] | [0.0000] | [0.0010] | [0.0000] | [0.0000] | [0.0020] | [0.0010] | [0.0000] | [0.0000] |
| **Leverage** | | | | 0.1794 | 0.1782 | | | 0.1744 | 0.1746 |
| | | | | [0.0000] | [0.0000] | | | [0.0000] | [0.0000] |
| **Sales Growth** | | | | | | -0.0026 | -0.0041 | -0.0029 | -0.0039 |
| | | | | | | [0.4510] | [0.1800] | [0.4240] | [0.2220] |
| **Adj. R-squared** | 0.0102 | 0.0089 | 0.0117 | 0.1370 | 0.1372 | 0.0023 | 0.0006 | 0.1469 | 0.1458 |

## 7.1 Disappearance of the Accrual Anomaly

Our base model (1) results for the entire period 1990-2010 confirm the negative accrual-return relation for annual excess stock returns only in the first and third year after accrual measurement. For year two there is no significant prediction power. There are obvious differences between the periods 1990-1999 and 2000-2010. The significant negative relation between accruals and next year's returns over the entire period is mainly due to the results in 1990-1999, whereas from 2000-2010 the relation is insignificant. The lack of significance for returns in the second year over the entire period is driven by its clear insignificance in the period 2000-2010, whereas from 1990 to 1999 accruals are significantly negatively related to returns in year two. The later periods' clear significance for t+3 returns in the base model (1) is striking, because there is no significance for t+1 and t+2 stock returns.

When adding controls for market leverage and sales growth to arrive at our extended model, the accrual anomaly stays intact in the earlier period with respect to excess stock returns in t+1 and t+2 only, while in the later period it vanishes completely. This change over time is consistent with the general picture in prior research, which reports a robust negative accrual-return relation up until the year 2000 (e.g. Richardson et al., 2005; Sloan, 1996; Xie, 2001) but finds first evidence for its disappearance after 2000 (Green et al., 2011; Richardson et al., 2010).

## 7.2 Have Investors Adapted Their Behavior to Research Findings?

One possible interpretation for the declining predictive power of accruals is that equity investors have adapted their behavior to the findings of Sloan (1996), by employing strategies that exploit the accrual anomaly a few years after Sloan first reported it in 1996 and his results had been confirmed and refined by other researchers (e.g. Bradshaw et al., 2001; Xie, 2001). This would be a form of adaptive market efficiency (cf. Grossman and Stiglitz, 1980), which is favored as explanation for the disappearance of the accrual anomaly by Green et al. (2011) and Richardson et al. (2010). Our reasoning is that since abnormal hedge portfolio returns based on extreme accrual portfolios in many papers (e.g. Richardson et al., 2005; Sloan, 1996; Xie, 2001) were highest in the first year after portfolio formation, followed by the second, it would make sense for investors to adjust their portfolios every year in order to reap the highest possible return in each subsequent year. This strategy however may not be the most profitable when considering the transaction costs for adjusting portfolio composition. Therefore, it is probable that many investors adjust the high and low accrual firms in their hedge portfolios less frequently, for example only every two years, while for other investors a yearly adjustment may still be most profitable. The combination of behaviors of these different investor types could result in insignificance not only for t+1 but also for t+2 returns. In other words, only excess returns with a two year horizon are traded away by a broad adaptation of the Sloan-style portfolio strategy for the period from the year 2000. Nevertheless, the sudden change of the accrual coefficient in the base model (1) into strong significance for t+3 returns is difficult to explain. While accruals tend to change with business cycles and working capital in the short term (Chan et al., 2006) and therefore the top and bottom groups of stocks will also change, there is no obvious reason why these changes should take place every two years or only be considered by investors two years after portfolio formation. In our extended model this odd significance for t+3 returns does not occur, instead all three future return years in the period 2000-2010 have insignificant accrual coefficients.

The inter-period changes of intercepts are ambiguous. They indicate that our base model (1) explains a larger part of stock returns in the *later* period than in the earlier. When regressing returns only on accruals we find that intercepts show a clear decrease of explanatory power in the later period, which is line with the disappearance of the accrual anomaly (see Table 5). But when regressing only on the combination of risk factors beta and size we obtain only small changes in intercepts between the two periods (Appendix A1), so that overall it is not clear what could drive the *increase* explanatory power of our base model (1) according to intercepts.

For our other independent variable, gross profits, the relation to excess returns in the future two years becomes stronger in the later period compared to the earlier (see Table 9). While in absolute terms this increase seems rather small, in relative terms it is moderate with 28.57% for t+1 and 45.14% for t+2, and note that the significance stays in the same range. Therefore this development can be interpreted as an increase of relevance of gross profitability for investor decisions. And this, mind you, in the period in which the accrual part of earnings has lost its prediction power, indicating an increased awareness of market actors for accounting quality considerations which may impact the figures reported in the income statement. The inter-period change of the gross profit coefficients is therefore in line with our hypothesis that investors have increasingly supplemented their basis for decision making with income statement measures that are less influenced by accounting subjectivity than earnings, such as gross profits. Admittedly, the fact that the gross profit-return relation is negative surprises us (for more details please see 7.4), and while it implies that investors attribute a negative value effect to higher gross profitability, it does not contradict our hypothesis that the use of gross profits as additional measure for investment decisions has increased because of its relatively high objectivity. However, the increased magnitude of coefficients could also only be a sign that investors link an even more value-adverse effect to high gross profits, instead of being a sign that they have increased their focus on this measure.

It should further be noted, that even though Novy-Marx (2013) argues for gross profits as the "cleanest" accounting measure, there is still the possibility to influence it. Abusing the principle of revenue recognition and the corresponding matching principle can influence the amount of gross profits actually obtained. For example Caylor (2010) examines managerial discretion in revenue recognition and finds evidence for a bias in order to achieve certain revenue benchmarks and to avoid earnings surprises.

### *7.3 How Much Does Risk Compensation Account for?*

The risk factors beta and size are not sufficient to explain the shift of the market's focus away from accruals because beta is never significant and the importance of size declines in the later period, as we discuss in more detail in the next paragraph.

From 1990-1999 size is a significant factor for excess stock returns for all three future years in addition to accruals. For this period, as well as the entire period, there is a weak negative size-return relation. A potential limitation of the employed model is that changes in accruals have a direct influence on our size measure total assets. Moreover, we use total assets to standardize our accrual as well as gross profit measure, which raises further concern about correlation between the control variable size and our explanatory variables. In terms of correlation, a moderate correlation of control variable with both dependent and independent variable is wanted, so since our size measure only weakly correlates with accruals (cf. Table 1: -0.002 Pearson; -0.014 Spearman), it may not be a useful control here. Then again, its correlation with the future return years we use as dependent variables is similarly weak, yet prior research has clearly found size to be a powerful predictor of cross sectional stock returns (e.g. Fama and French, 1992). In comparison, the correlation between our size measure and gross profits is more pronounced (cf. Table 1: -0.113 Pearson; -0.185 Spearman).

From 2000-2010, we do not find size to be significant in addition to accruals for predicting future stock returns anymore. Possible reasons for this change are hard to pinpoint. In line with our argument that the two big stock market crashes of 2000 and 2008 have strong influence on our second period's results, are Hou and van Dijk (2008) who find that cash-flow and profitability shocks can distort the otherwise significantly negative size-return relationship. Note however, that there is evidence for (e.g. Amel-Zadeh, 2011) and against (e.g. Fama and French, 2012) the existence of this size effect in the recent past, and that even the validity of size as a source of systematic risk is challenged (cf. van Dijk, 2011). Also, research on the size effect mostly refers to market capitalization, instead of book value of total assets which is the measure we use.

We further add market leverage to our base models as a risk control for financial distress, in addition to beta and size. Both accruals as well as gross profitability maintain their predictive power for next year's returns when controlling for market leverage. For returns longer into the future their power does not persist when including market leverage. Therefore our results indicate that neither accruals nor gross profits are a meaningful extension to default risk for explaining excess returns more than one year into the future. For next year's returns however, accruals and gross profits each individually provide significant prediction power that is not accounted for by any of the risk factors beta, size or market leverage. Since the accrual part of earnings is mainly based on working capital items, which exclude long-term debt, and gross profits are unaffected by interest on debt and tax shields, there is no obvious relation between market leverage and the numerators of our explanatory variables. There is however a possibly strong positive correlation between market leverage and total assets (0.40 Spearman; 0.06 Pearson; both for ln(Total Assets)), which means the denominator of our independent variables correlates with our leverage control variable. Therefore, when market leverage increases, the denominator of our regressors on average also increases, making the variable smaller than it would be otherwise. This is part of the reason why market leverage absorbs so much of the prediction power of both independent variables that they become insignificant for returns further than one year into the future. Moreover, market capitalization in the denominator of our market leverage measure, is directly affected by the part of stock returns that are due to stock price changes (as opposed to dividends). Hence, the leverage control is influenced by the dependent variable in a direct way and therefore not completely exogenous. We expect these limitations to have a lowering effect on statistical significance, which lets us conclude that there is definitely predictive power of both our explanatory variables for next year's returns, and possibly also for later return years although our regression output reports otherwise.

The finding that when including market leverage, accruals have no significant role in explaining any of the future return years in the period 2000-2010 can be interpreted as an increased focus of investors on financial distress risk as determinant for stock returns. Since this is not the case for the period 1990-1999, this paradigm shift might have been caused by the bursting of the dot-com bubble and the global financial crisis, which both took place during the later period, and are adequate reasons for investors to focus stronger on risk, instead of earnings power and profitability. Events of that scale, influencing stock prices on such a broad front, did not occur during the period 1990-1999. Controlling for market leverage supports the interpretation of these events being responsible for the disappearance of the accrual anomaly, because no accrual coefficient shows significance in the later period when market leverage is included, while without it accruals were at least significant for t+3 returns. In addition, although still mostly statistically insignificant, the on average lower p-test results and higher coefficients for beta in the later period could hypothetically be an indication for an increasing focus of investors on market risk due to aforementioned events.

### *7.4 Is There a Penalty for Gross Profitability?*

Our results for gross profits as explanatory variable in base model (2) contradict those presented by Novy-Marx (2013) to a certain extent. While he finds a positive relation of gross profitability to stock returns, we find it to be negative. More specifically we find that high gross profits in the current year are likely to be followed by low excess stock returns in the subsequent three years, or more generally that the stock market assigns a penalty to high gross profitability. This is counterintuitive, since a higher gross profit in relation to the firm's asset base should on average enable the generation of higher cash-flows and hence more firm-value.

When extending our base controls beta and size by market leverage and sales growth, there is no significant explanatory power of gross profitability for future excess stock returns for any of the future three years' returns. Something to consider in this context is the strong direct relation of gross profit to the control variable sales growth. Note also that higher market leverage may enable the generation of higher gross profits, but that this effect should be mitigated by normalizing with total assets. Since an increase in debt will also increase total assets in the denominator of our independent variable, the economically enhancing effect of market leverage for gross profitability should therefore approximately be offset by the mathematically lowering effect of debt on our normalized gross profit measure. Apart from these technical considerations, in the eyes of the investors the advantage of gross profits being largely unaffected by accounting choices may be outweighed by the disadvantage of not reflecting a firm's cost considerations sufficiently, as strategically important expenses such as distribution or research and development are not included.

In light of our results it is important to note that Novy-Marx's (2013) notion that "profitable firms generate significantly higher average returns" (Novy Marx 2013, p. 13) only seems to apply to returns in the same year as the one in which gross profitability is measured. Depending on the controls used, if anything, gross profits show a negative correlation with returns in the *future* three years, while their prediction power is diminished completely when controlling for our extended set of risk factors combined with sales growth. When regressing gross profits in year t on excess stock returns in year t and only controlling for beta and size, we also obtain significantly positive coefficients, which confirms Novy-Marx's (2013) results. The magnitude of the relation is smaller in our study though. While Novy-Marx (2013) obtains a coefficient of 0.75, ours is only 0.11, which is a significant discrepancy. Like ours, his observation period ends in 2010, but his dates back all the way to 1963 so that his mean coefficients could be driven by the period before 1990, which is not included in our sample. Nevertheless it remains true that Novy-Marx's (2013) regression specification does not allow any inference about the predictive power of gross profitability for *future* excess stock returns, only about the correlation between gross profitability and returns in the same year. Other research on the profitability-return relation is overall limited and ambiguous, as the following examples will show.

Roughly in line with our findings, Fama and French (1993) relate high average returns to low profitabilities and state that especially "low-BE/ME firms have persistently high earnings and high-BE/ME firms have persistently low earnings" (Fama and French 1993, p. 53), which could also be due to the profitability penalty that we found indications of.

Fama and French's (2006) research is also comparable to ours, as they also check the predictive power of profitability and asset growth for one, two and three years *ahead,* instead of for the same period. They further use cross-section regressions to predict stock returns. They derive the expected profitabilities from the Dividend Discount Model and from lagged accounting fundamentals and try to find the explanatory value of it for future periods. But Fama and French

(2006) use a different proxy than Novy-Marx (2013) and ourselves for profitability. Furthermore, their coefficients for the profitability variables are positive. This is more in line with Novy-Marx's (2013) findings and what we initially expected of our model. Performing more regressions to find an explanation, Fama and French (2006) conclude that not the profitability proxy itself, but rather the lagged fundamentals are the factors that drive returns, so that profitability only contributes a small amount to the prediction of returns. They suggest this to be due to a combination of measurement error and collinearity issues among their variables. Ultimately, Fama and French's (2006) findings are not in line with ours, as we find Gross Profit to be statistically significant for the prediction of future excess stock returns.

Considering size differences, Novy-Marx (2013) finds that the predictive power of profitability is economically significant even among the largest stocks, whereas our data indicates that this is not the case, at least not for future years' returns. In our sample the top 10% of largest firms show statistical insignificance of Gross Profits as predictive variable for the three years following period t. However, the reason for this insignificance of results is most likely the reduction of sample size to approximately 7000 firm-year observations for each group for the entire period of 1990-2010. The influence of outliers in a smaller sample group is considerably higher and could therefore be responsible for the lack of significance of Gross Profits for the sample of large companies.

It should further be noted, that even though Novy-Marx (2013) argues for Gross Profit as the "cleanest" accounting measure, there is still the possibility to influence it. Abusing the principle of revenue recognition and the corresponding matching principle can influence the amount of gross profit actually obtained. For example Caylor (2010) examines managerial discretion in revenue recognition and finds evidence for a bias in order to achieve certain revenue benchmarks and to avoid earnings surprises.

### *7.5 Accounting Subjectivity Not the Main Issue After All?*

We used the widely supported notion that earnings manipulation was the main reason for the existence of the accrual anomaly as basic premise for our hypothesis that gross profits should gain predictive power after the 2000, as accruals lose it. Since we only found limited support for this hypothesis, we shortly examine the extrapolation growth bias as alternative to earnings manipulation for explaining the accrual anomaly before 2000 (cf. Chan et al., 2006).

According to Fairfield et al. (2003b) the difference in earnings persistence between accrual and cash-flow measures first reported by Sloan (1996) disappears when using lagged average total assets to normalize the accrual measure. While this negates an overestimation of persistence of accrual earnings by investors as reason for the negative accrual-return relation, the alternative explanation that it offers is that investors are overoptimistic about the future profitability of firms with currently strong asset growth or firms with high absolute total assets (Fairfield et al., 2003a). Investors would therefore not necessarily be misled by the earnings or profitability measure, but instead by the changes in the asset base, which would support the extrapolation growth bias hypothesis. Our results support the notion of Fairfield et al. (2003a), indicating that accruals divided by lagged total assets do not have significant prediction power for next year's returns. On the other hand, the significance of the relation between next year's returns and gross profits, which are not directly related to current total assets, stays exactly the same when using lagged total assets to normalize. We conclude that the normalization by current total assets is a limitation of Sloan's (1996) method and therefore of ours as well. However, we also note that alternative measures that could be useful for standardizing have the same general issue. For example, sales do not have such a strong relation to accruals, but are directly related to gross profits. Using differing measures to normalize our two variables would contradict the aim to achieve comparability.

Therefore we find it to be especially important to consider current growth as potential root of a bias that could help explain the accrual anomaly. We find however that controlling for current sales growth does not substantially reduce the predictive power of accruals or gross profits. This is especially noteworthy considering that we find strong correlations between sales growth on the one hand and accruals and gross profits respectively on the other (see table 2). Further Zhang (2007) finds that different forms of firm growth, such as growth in number of employees, in financing or in total assets, correlate strongly with a firm's accruals. Chan et al. (2006) notes that "If extrapolative biases are boosting investor valuations of firms with high accruals, the [...] sales-related, accrual component should do well in predicting future returns." (Chan et al. 2006, p. 1044) If the accrual-return or gross profit-return relations were driven by investors extrapolating current firm growth, then our growth control should interfere strongly with these relations. Since this is not the case, we conclude that the accrual-return as well as the gross profit-return relations that we are assessing in this thesis, are unlikely to be only a symptom of the extrapolation growth bias. A limitation of our method in this context is that the maximum time difference between sales growth and excess stock returns is three years. It is possible that investors' growth expectations deviate much more from reality in forecasts longer than three years ahead, so this period could be too short to reveal the full magnitude of an extrapolation growth bias.

## 8. Conclusion

This thesis contrasts the prediction power of accruals and gross profits for future excess stock returns. We confirm the well-documented negative accrual-return relation for the period 1990-1999, and do not find this relation for the years 2000-2010. Thereby, we add to the still limited research indicating the recent disappearance of the accrual anomaly. Gross profitability shows a negative relation to future returns that is time-consistent over both periods, but the correlation is weaker than that of accruals and does not persist in the partial periods under extended controls for market leverage and sales growth.

The vanished relevance of accruals after the year 2000 might be partially replaced by a stronger relevance of gross profits. However, we do not provide evidence for a *direct relation* between increased magnitude of gross profits coefficients and insignificance of accrual coefficients. In any case, a higher compensation for beta- and size-related risk in the later period as replacement for part of the relevance of accruals is not supported by our results. We therefore find support for the hypothesis of adaptive market efficiency in the context of the accrual anomaly, that is the exploitation of the anomaly by market actors as reaction to its revelation by researchers, resulting in its disappearance. Investors unaware of the existence of this anomaly in the past, may still focus strongly on earnings, irrespective of possible issues with accounting quality. Only that since the year 2000 an amount of capital large enough to trade away the accrual anomaly has been specifically dedicated to profit from exactly this anomaly, so that the earnings fixation of unaware investors who do not try to exploit the anomaly is outweighed since then.

A serious alternative to adaptive market efficiency that is offered by our results, is a reduced focus on income-based measures in favor of more focus on financial distress risk against the backdrop of the end of the dot-com bubble and the global financial crisis. This is based on the lack of significance of our results after 2000 when adding market leverage as control. In case of such a temporary paradigm shift, the accrual anomaly should return in the future, given that there are no comparable large-scale crises for a sufficient period of time.

Some of the most important limitations of our method are unwanted interaction effects between variables. Foremost there is a direct effect of the accrual part of earnings on total assets which we use to standardize the accrual measure. Moreover, our control for market leverage lacks exogeneity, and is also strongly correlated with total assets in the denominators of both our explanatory variables. Also, as in similar studies, our determination coefficient is low. Furthermore, the scope of our work is limited to suggesting potential explanations to our empirical findings based on prior research and logic, so we cannot give a final verdict on which explanations are the right ones.

It could be fruitful for future research to further explore the reasoning underlying investors' choice of financial statement items to base their decisions on. Also more studies on the relation between gross profitability and *future* stock returns should be done and if the counterintuitive negative relation is confirmed, explanations should be found. Finally, the accrual-return relation should be continuously tracked over time, since a reappearance (or lack thereof) might shed light on the question why it has vanished in the first place.

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# 10. Appendix

## A1 - Beta and Size Time Split

Appendix A1

Panel A

Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Beta Coeff.** | -0.0133 | 0.0334 | 0.0182 | **P > t Beta** | 0.7640 | 0.7220 | 0.8190 |
| **Ln (TA) Coeff.** | -0.0854 | -0.0743 | -0.0559 | **P > t LN (TA)** | 0.0090 | 0.0150 | 0.0320 |
| **Intercept** | 0.5955 | 0.5050 | 0.3896 | **Adjusted R2** | 0.0042 | 0.0027 | 0.0018 |

$R^e_{t+\tau} = \alpha + \gamma_1 BETA_t + \gamma_2 SIZE_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Beta Coeff.** | 0.1640 | 0.1560 | 0.0713 | **P > t Beta** | 0.3820 | 0.0950 | 0.1770 |
| **Ln (TA) Coeff.** | -0.0808 | -0.0525 | -0.0337 | **P > t LN (TA)** | 0.0290 | 0.1590 | 0.2590 |
| **Intercept** | 0.5518 | 0.4085 | 0.4283 | **Adjusted R2** | 0.0008 | 0.0002 | 0.0001 |

$R^e_{t+\tau} = \alpha + \gamma_1 BETA_t + \gamma_2 SIZE_t + \varepsilon$

## A2 - Accruals and Gross Profits in Combination

Appendix A2

Panel A

Fama and MacBeth regressions on model (3), Years 1990-2010, 69,993 firm-year observations

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **Accrual Coeff.** | -1.0784 | -0.1872 | -0.3420 | **P > t Accrual** | 0.0350 | 0.5970 | 0.0020 |
| **GP Coeff.** | -0.1682 | -0.2950 | -0.2508 | **P > t GP** | 0.0080 | 0.0030 | 0.0140 |
| **Beta Coeff.** | 0.1007 | 0.1167 | 0.0665 | **P > t Beta** | 0.3140 | 0.0800 | 0.1950 |
| **Ln (TA) Coeff.** | -0.0876 | -0.0724 | -0.0504 | **P > t LN (TA)** | 0.0010 | 0.0060 | 0.0160 |
| **Intercept** | 0.6010 | 0.6134 | 0.5216 | **Adjusted R2** | 0.0117 | 0.0093 | 0.0087 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 GP_t + \gamma_3 BETA_t + \gamma_4 SIZE_t + \varepsilon$

Panel B

Fama and MacBeth regressions on model (3), Years 1990-1999, 33,706 firm-year observations

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **Accrual Coeff.** | -0.8585 | -0.7574 | -0.3986 | **P > t Accrual** | 0.0010 | 0.0100 | 0.0360 |
| **GP Coeff.** | -0.1491 | -0.2083 | -0.2688 | **P > t GP** | 0.0740 | 0.0290 | 0.0590 |
| **Beta Coeff.** | 0.0300 | 0.0889 | 0.0670 | **P > t Beta** | 0.4710 | 0.4150 | 0.4860 |
| **Ln (TA) Coeff.** | -0.1010 | -0.0856 | -0.0690 | **P > t LN (TA)** | 0.0030 | 0.0150 | 0.0240 |
| **Intercept** | 0.7006 | 0.6093 | 0.5382 | **Adjusted R2** | 0.0134 | 0.0087 | 0.0083 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 GP_t + \gamma_3 BETA_t + \gamma_4 SIZE_t + \varepsilon$

Panel C

Fama and MacBeth regressions on model (3), Years 2000-2010, 36,287 firm-year observations

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **Accrual Coeff.** | -1.2782 | 0.3311 | -0.2906 | **P > t Accrual** | 0.1910 | 0.5920 | 0.0180 |
| **GP Coeff.** | -0.1855 | -0.3738 | -0.2344 | **P > t GP** | 0.0620 | 0.0290 | 0.1290 |
| **Beta Coeff.** | 0.1650 | 0.1419 | 0.0662 | **P > t Beta** | 0.3920 | 0.1010 | 0.2030 |
| **Ln (TA) Coeff.** | -0.0755 | -0.0604 | -0.0336 | **P > t LN (TA)** | 0.0530 | 0.1410 | 0.2600 |
| **Intercept** | 0.5105 | 0.6170 | 0.5065 | **Adjusted R2** | 0.0103 | 0.0099 | 0.0091 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 GP_t + \gamma_3 BETA_t + \gamma_4 SIZE_t + \varepsilon$

## A3 - Accruals With Industries, Time Split

Appendix A3
Panel A
Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.8427 | -0.7715 | -0.4004 | **P > t Accrual** | 0.0010 | 0.0110 | 0.0360 |
| **Beta Coeff.** | 0.0356 | 0.0857 | 0.0638 | **P > t Beta** | 0.3640 | 0.4000 | 0.4510 |
| **Ln (TA) Coeff.** | -0.1006 | -0.0835 | -0.0625 | **P > t LN (TA)** | 0.0030 | 0.0130 | 0.0190 |
| **Intercept** | 0.6284 | 0.4896 | 0.3747 | **Adjusted R2** | 0.0180 | 0.0140 | 0.0120 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.0230 | 0.0310 | 0.7960 |
| **Mining** | 0.1550 | 0.1250 | 0.1130 |
| **Construction** | 0.1840 | 0.1330 | 0.0420 |
| **Transportation, Communications, Electric, Gas & Sanitary Services** | 0.4650 | 0.4560 | 0.5480 |
| **Wholesale Trade** | 0.2320 | 0.6240 | 0.1830 |
| **Retail Trade** | 0.8110 | 0.6440 | 0.9090 |
| **Real Estate** | 0.8480 | 0.4710 | 0.4580 |
| **Services** | 0.2930 | 0.8440 | 0.5140 |
| **Public Administration** | - | - | - |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

Panel B
Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.2685 | 0.3374 | -0.2645 | **P > t Accrual** | 0.1920 | 0.5930 | 0.0250 |
| **Beta Coeff.** | 0.1814 | 0.1658 | 0.0936 | **P > t Beta** | 0.3820 | 0.0900 | 0.1320 |
| **Ln (TA) Coeff.** | -0.0844 | -0.0707 | -0.0448 | **P > t LN (TA)** | 0.0300 | 0.0640 | 0.0400 |
| **Intercept** | 0.4515 | 0.4900 | 0.4238 | **Adjusted R2** | 0.0161 | 0.0133 | 0.0106 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.8990 | 0.7760 | 0.1240 |
| **Mining** | 0.8790 | 0.5210 | 0.8330 |
| **Construction** | 0.4950 | 0.4290 | 0.3210 |
| **Transportation, Communications, Electric, Gas & Sanitary Services** | 0.2290 | 0.2230 | 0.2570 |
| **Wholesale Trade** | 0.5640 | 0.1430 | 0.1750 |
| **Retail Trade** | 0.8670 | 0.9720 | 0.5640 |
| **Real Estate** | 0.0460 | 0.4550 | 0.6800 |
| **Services** | 0.8770 | 0.9170 | 0.7720 |
| **Public Administration** | 0.2000 | 0.3390 | 0.3390 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

## A4 - Gross Profits with Industries, Time Split

Appendix A4
Panel A
Fama and MacBeth regressions, Years 1990-1999

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **GP Coeff.** | -0.1607 | -0.2263 | -0.2858 | **P > t GP** | 0.0660 | 0.0330 | 0.0580 |
| **Beta Coeff.** | 0.0206 | 0.0724 | 0.0621 | **P > t Beta** | 0.5920 | 0.4460 | 0.4850 |
| **Ln (TA) Coeff.** | -0.1012 | -0.0838 | -0.0638 | **P > t LN (TA)** | 0.0030 | 0.0130 | 0.0210 |
| **Intercept** | 0.7320 | 0.6104 | 0.5158 | **Adjusted R2** | 0.0149 | 0.0120 | 0.0124 |

| Significance: Industries | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.0090 | 0.0240 | 0.9250 |
| **Mining** | 0.1590 | 0.1260 | 0.1710 |
| **Construction** | 0.1480 | 0.0940 | 0.0220 |
| **Transportation, Communications, Electric, Gas & Sanitary Services** | 0.6440 | 0.9620 | 0.0790 |
| **Wholesale Trade** | 0.1210 | 0.4410 | 0.1510 |
| **Retail Trade** | 0.6390 | 0.1690 | 0.2950 |
| **Real Estate** | 0.8920 | 0.5020 | 0.5120 |
| **Services** | 0.5040 | 0.5870 | 0.4030 |
| **Public Administration** | - | - | - |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

Panel B
Fama and MacBeth regressions, Years 2000-2010

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **GP Coeff.** | -0.2212 | -0.3178 | -0.1803 | **P > t GP** | 0.0430 | 0.0290 | 0.1530 |
| **Beta Coeff.** | 0.1732 | 0.1490 | 0.0848 | **P > t Beta** | 0.4020 | 0.1340 | 0.1290 |
| **Ln (TA) Coeff.** | -0.0979 | -0.0702 | -0.0453 | **P > t LN (TA)** | 0.0220 | 0.0620 | 0.0360 |
| **Intercept** | 0.6882 | 0.5843 | 0.5028 | **Adjusted R2** | 0.0129 | 0.0124 | 0.0143 |

| Significance: Industries | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.8940 | 0.8510 | 0.1010 |
| **Mining** | 0.9070 | 0.8710 | 0.7770 |
| **Construction** | 0.6670 | 0.5410 | 0.3480 |
| **Transportation, Communications, Electric, Gas & Sanitary Services** | 0.2520 | 0.2440 | 0.2680 |
| **Wholesale Trade** | 0.5060 | 0.3180 | 0.1540 |
| **Retail Trade** | 0.1650 | 0.1060 | 0.5110 |
| **Real Estate** | 0.0120 | 0.1250 | 0.4650 |
| **Services** | 0.6590 | 0.7060 | 0.4700 |
| **Public Administration** | 0.2210 | 0.3390 | 0.3390 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

## A5 - Accruals with Industries (excl. IT Industry), All

Appendix A5

Panel A

Fama and MacBeth regressions, Years 1990-2010, Excluding IT Industry

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.1591 | -0.1366 | -0.2689 | **P > t Accrual** | 0.0620 | 0.7510 | 0.0180 |
| **Beta Coeff.** | 0.1357 | 0.1548 | 0.0983 | **P > t Beta** | 0.2500 | 0.0490 | 0.0960 |
| **Ln (TA) Coeff.** | -0.0872 | -0.0766 | -0.0501 | **P > t LN (TA)** | 0.0010 | 0.0030 | 0.0010 |
| **Intercept** | 0.4828 | 0.4757 | 0.3731 | **Adjusted R2** | 0.0169 | 0.0150 | 0.0139 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.5160 | 0.8020 | 0.7430 |
| **Mining** | 0.5530 | 0.1130 | 0.2200 |
| **Construction** | 0.7160 | 0.6570 | 0.5900 |
| **Transportation, Communications,** | 0.1870 | 0.1750 | 0.2960 |
| **Wholesale Trade** | 0.2460 | 0.1770 | 0.0210 |
| **Retail Trade** | 0.8430 | 0.6330 | 0.5320 |
| **Real Estate** | 0.9440 | 0.4760 | 0.4390 |
| **Services** | 0.9350 | 0.5700 | 0.4600 |
| **Public Administration** | 0.1930 | 0.3290 | 0.3290 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 1990-1999, Excluding IT Industry

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.8170 | -0.8820 | -0.3730 | **P > t Accrual** | 0.0050 | 0.0100 | 0.0890 |
| **Beta Coeff.** | 0.0532 | 0.1311 | 0.0984 | **P > t Beta** | 0.2680 | 0.3030 | 0.3800 |
| **Ln (TA) Coeff.** | -0.0894 | -0.0820 | -0.0577 | **P > t LN (TA)** | 0.0020 | 0.0070 | 0.0110 |
| **Intercept** | 0.5479 | 0.4465 | 0.3245 | **Adjusted R2** | 0.0174 | 0.0140 | 0.0125 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.0400 | 0.0810 | 0.7520 |
| **Mining** | 0.3070 | 0.1710 | 0.1020 |
| **Construction** | 0.2670 | 0.1350 | 0.0340 |
| **Transportation, Communications,** | 0.5230 | 0.2560 | 0.1380 |
| **Wholesale Trade** | 0.2710 | 0.8150 | 0.1720 |
| **Retail Trade** | 0.9360 | 0.5570 | 0.7070 |
| **Real Estate** | 0.8070 | 0.4580 | 0.4320 |
| **Services** | 0.1140 | 0.6170 | 0.5900 |
| **Public Administration** | - | - | - |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

Panel C

Fama and MacBeth regressions, Years 2000-2010, Excluding IT Industry

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| **ıdFishing Minir** | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.4390 | 0.4734 | -0.1838 | **P > t Accrual** | 0.2050 | 0.5130 | 0.1110 |
| **Beta Coeff.** | 0.2033 | 0.1741 | 0.0983 | **P > t Beta** | 0.3480 | 0.0990 | 0.1240 |
| **Ln (TA) Coeff.** | -0.0854 | -0.0722 | -0.0439 | **P > t LN (TA)** | 0.0420 | 0.0880 | 0.0520 |
| **Intercept** | 0.4295 | 0.4996 | 0.4129 | **Adjusted R2** | 0.0165 | 0.0160 | 0.0153 |

| **Significance: Industries** | | | |
|---|---|---|---|
| **P > t for** | **t+1** | **t+2** | **t+3** |
| **Agriculture, Forestry and Fishing** | 0.8950 | 0.7750 | 0.1260 |
| **Mining** | 0.8780 | 0.4700 | 0.8440 |
| **Construction** | 0.4860 | 0.4240 | 0.3230 |
| **Transportation, Communications,** | 0.2290 | 0.2240 | 0.2560 |
| **Wholesale Trade** | 0.6820 | 0.1440 | 0.0770 |
| **Retail Trade** | 0.8480 | 0.9980 | 0.6040 |
| **Real Estate** | 0.0510 | 0.4900 | 0.6590 |
| **Services** | 0.4470 | 0.7330 | 0.6100 |
| **Public Administration** | 0.1970 | 0.3390 | 0.3390 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 AFF_t + \cdots + \gamma_{13} PUBADM_t + \varepsilon$

## A6 - Gross Profits, Top and Bottom 10% of Total Assets

Appendix A6

Panel A

Fama and MacBeth regressions, Years 1990-2010, Top 10% Total Assets

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **GP Coeff.** | -0.1963 | -0.3649 | -0.4411 | **P > t GP** | 0.1430 | 0.2040 | 0.2460 |
| **Beta Coeff.** | 0.2308 | 0.2549 | 0.1269 | **P > t Beta** | 0.2630 | 0.1770 | 0.1780 |
| **Intercept** | -0.0912 | -0.0334 | 0.1411 | **Adjusted R2** | 0.0015 | 0.0007 | 0.0009 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 1990-2010, Bottom 10% Total Assets

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **GP Coeff.** | -0.2466 | -0.3754 | -0.0964 | **P > t GP** | 0.2090 | 0.0400 | 0.6790 |
| **Beta Coeff.** | 0.5680 | 0.1244 | -0.2769 | **P > t Beta** | 0.2890 | 0.6550 | 0.3930 |
| **Intercept** | 0.8875 | 0.9711 | 0.8691 | **Adjusted R2** | 0.0006 | 0.0006 | 0.0000 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \varepsilon$

## A7 - Accruals, Top and Bottom 10% of Market Capitalization

Appendix A7

Panel A

Fama and MacBeth regressions, Years 1990-2010, Top 10% Market Cap.

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **Accrual Coeff.** | -0.2177 | -0.2978 | -0.0563 | **P > t Accrual** | 0.0530 | 0.0080 | 0.5650 |
| **Beta Coeff.** | -0.0053 | 0.0415 | 0.0119 | **P > t Beta** | 0.8730 | 0.2260 | 0.6380 |
| **Intercept** | -0.0359 | -0.0596 | -0.0006 | **Adjusted R2** | 0.0034 | 0.0059 | 0.0022 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 1990-2010, Bottom 10% Market Cap.

| Independent Variables | | | | Significance | | | |
|---|---|---|---|---|---|---|---|
| | t+1 | t+2 | t+3 | | t+1 | t+2 | t+3 |
| **Accrual Coeff.** | -2.7345 | 8.3600 | -0.4314 | **P > t Accrual** | 0.1400 | 0.3630 | 0.2310 |
| **Beta Coeff.** | 0.6250 | 1.0128 | 0.0020 | **P > t Beta** | 0.1770 | 0.1380 | 0.9880 |
| **Intercept** | 0.4944 | 1.0111 | 0.4819 | **Adjusted R2** | 0.0059 | 0.0007 | 0.0004 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \varepsilon$

## A8 - Base Model Gross Profits and Market Leverage

Appendix A8

Panel A

Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.1222 | -0.1729 | -0.2284 | **P > t GP** | 0.0840 | 0.0920 | 0.1150 |
| **Beta Coeff.** | 0.0232 | 0.0918 | 0.0755 | **P > t Beta** | 0.5830 | 0.3690 | 0.4260 |
| **Ln (TA) Coeff.** | -0.1072 | -0.0943 | -0.0771 | **P > t LN (TA)** | 0.0030 | 0.0090 | 0.0110 |
| **Leverage Coeff.** | 0.1343 | 0.1521 | 0.1399 | **P > t Leverage** | 0.0000 | 0.0190 | 0.0500 |
| **Intercept** | 0.6971 | 0.6034 | 0.5172 | **Adjusted R2** | 0.0098 | 0.0059 | 0.0048 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.1284 | -0.0527 | 0.3316 | **P > t GP** | 0.1690 | 0.8080 | 0.4360 |
| **Beta Coeff.** | 0.1028 | 0.0967 | 0.1904 | **P > t Beta** | 0.3940 | 0.0900 | 0.1670 |
| **Ln (TA) Coeff.** | -0.1176 | -0.1405 | -0.1647 | **P > t LN (TA)** | 0.0120 | 0.0540 | 0.0960 |
| **Leverage Coeff.** | 0.2181 | 1.1626 | 2.2714 | **P > t Leverage** | 0.0020 | 0.3070 | 0.2900 |
| **Intercept** | 0.7771 | 0.6993 | 0.4647 | **Adjusted R2** | 0.1738 | 0.0042 | 0.0020 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \varepsilon$

## A9 - Extended Model, Accruals, Time Split

Appendix A9

Panel A

Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| **:h** | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -0.8367 | -0.7396 | -0.3164 | **P > t Accrual** | 0.0040 | 0.0350 | 0.0640 |
| **Beta Coeff.** | 0.0222 | 0.1250 | 0.0851 | **P > t Beta** | 0.5950 | 0.3010 | 0.3820 |
| **Ln (TA) Coeff.** | -0.1012 | -0.0958 | -0.0742 | **P > t LN (TA)** | 0.0090 | 0.0170 | 0.0200 |
| **Leverage Coeff.** | 0.1272 | 0.1643 | 0.1339 | **P > t Leverage** | 0.0000 | 0.0220 | 0.0830 |
| **Sales Gro Coeff.** | -0.0046 | -0.0121 | 0.0175 | **P > t Sales Gro** | 0.3230 | 0.1910 | 0.4010 |
| **Intercept** | 0.5742 | 0.4878 | 0.3810 | **Adjusted R2** | 0.0067 | 0.0015 | 0.0003 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \gamma_5 SALGR_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **Accrual Coeff.** | -1.3631 | 0.2445 | 0.1229 | **P > t Accrual** | 0.2230 | 0.6220 | 0.6970 |
| **Beta Coeff.** | 0.1149 | 0.1237 | 0.1559 | **P > t Beta** | 0.3910 | 0.0320 | 0.2540 |
| **Ln (TA) Coeff.** | -0.0706 | -0.1494 | -0.1652 | **P > t LN (TA)** | 0.0170 | 0.0630 | 0.1330 |
| **Leverage Coeff.** | 0.2121 | 1.2757 | 2.4721 | **P > t Leverage** | 0.0060 | 0.3090 | 0.2900 |
| **Sales Gro Coeff.** | -0.0003 | -0.0048 | -0.0051 | **P > t Sales Gro** | 0.9610 | 0.6610 | 0.4100 |
| **Intercept** | 0.3471 | 0.7254 | 0.5007 | **Adjusted R2** | 0.1962 | 0.0043 | 0.0020 |

$R^e_{t+\tau} = \alpha + \gamma_1 ACCR_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \gamma_5 SALGR_t + \varepsilon$

## A10 - Extended Model, Gross Profits, Time Split

Appendix A10

Panel A

Fama and MacBeth regressions, Years 1990-1999, 33,706 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.1227 | -0.1641 | -0.2441 | **P > t GP** | 0.1130 | 0.1640 | 0.1650 |
| **Beta Coeff.** | 0.0076 | 0.1121 | 0.0881 | **P > t Beta** | 0.8570 | 0.3250 | 0.4140 |
| **Ln (TA) Coeff.** | -0.1019 | -0.0965 | -0.0780 | **P > t LN (TA)** | 0.0110 | 0.0180 | 0.0260 |
| **Leverage Coeff.** | 0.1278 | 0.1600 | 0.1281 | **P > t Leverage** | 0.0000 | 0.0250 | 0.0960 |
| **Sales Gro Coeff.** | -0.0043 | -0.0159 | 0.0110 | **P > t Sales Gro** | 0.2920 | 0.1380 | 0.4890 |
| **Intercept** | 0.6655 | 0.5900 | 0.5136 | **Adjusted R2** | 0.0056 | 0.0007 | 0.0007 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \gamma_5 SALGR_t + \varepsilon$

Panel B

Fama and MacBeth regressions, Years 2000-2010, 36,287 firm-year observations

| **Independent Variables** | | | | **Significance** | | | |
|---|---|---|---|---|---|---|---|
| | **t+1** | **t+2** | **t+3** | | **t+1** | **t+2** | **t+3** |
| **GP Coeff.** | -0.0600 | -0.0173 | 0.4835 | **P > t GP** | 0.4010 | 0.9500 | 0.3250 |
| **Beta Coeff.** | 0.1197 | 0.1163 | 0.1719 | **P > t Beta** | 0.3820 | 0.0600 | 0.2580 |
| **Ln (TA) Coeff.** | -0.0837 | -0.1495 | -0.1628 | **P > t LN (TA)** | 0.0260 | 0.0560 | 0.1300 |
| **Leverage Coeff.** | 0.2117 | 1.2785 | 2.5039 | **P > t Leverage** | 0.0060 | 0.3100 | 0.2910 |
| **Sales Gro Coeff.** | -0.0024 | -0.0058 | -0.0002 | **P > t Sales Gro** | 0.6560 | 0.6310 | 0.9610 |
| **Intercept** | 0.5329 | 0.7195 | 0.2828 | **Adjusted R2** | 0.1956 | 0.0043 | 0.0020 |

$R^e_{t+\tau} = \alpha + \gamma_1 GP_t + \gamma_2 BETA_t + \gamma_3 SIZE_t + \gamma_4 LEV_t + \gamma_5 SALGR_t + \varepsilon$