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CAN ACCRUAL-BASED METRICS INDICATE MATERIAL ACCOUNTING MISSTATEMENTS? EVIDENCE ON AUDIT ADJUSTMENTS

Abstract:

This paper analyses the usefulness of various accrual-based measures in detecting material accounting misstatements. Predicting financial misstatements has been of great interest not only to researchers but also to investors, auditors, financial analysts and regulators. However, since pre-audit financial statements are usually not available, prior research is mainly based only on samples of Securities and Exchange Commission (SEC) enforcement actions. We exploit almost unique institutional framework in which Croatian listed companies are required to publish both pre-audit and audited annual financial statements. Therefore, we are able to investigate which pre-audit financial indicators are significantly related to accounting misstatements detected by independent statutory audit, i.e. audit adjustments. Using a sample of 437 pairs of pre-audit and audited financial statements during 2009-2018, we find that financial statements with high value of absolute residuals from the Dechow-Dichev accrual model modified by McNichols (2002) are more likely to contain material misstatements of net income, working capital or fixed assets.

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Keywords:

Audit adjustments; Pre-audit financial statements; Earnings quality; Accounting misstatements

JEL Classification: M41, M42

1 Introduction

The importance of high quality financial reporting system has been well recognized by academics, standard setters and market regulators. Intentional or unintentional financial misreporting usually leads to an increase in a level of information asymmetry and higher auditor litigation risks. It causes negative stock price reactions for firms' investors and severely weakens confidence in capital markets (Xu and Zhu, 2014; Dechow et al, 1996; Farber, 2005). Therefore, detecting a misstatement in financial disclosure has been an important challenge not only for auditors and tax regulators from a practical perspective but also for researchers. Due to the significance of this topic, researchers have performed numerous studies to better understand the causes, motivations and consequences of financial misstatements (see Kim et al, 2016; Beneish 1999; Dechow et al, 2010). Almost all of previous studies are performed on samples that contain financial restatements, such as of Securities and Exchange Commission (SEC) enforcement actions (Barton et al, 2024). However, these studies rely on the restatement data set that is very unbalanced and contains only a few misstatements. Restatements represent instances in which auditor issues an unqualified opinion on financial statements that were materially misstated (Barton et al, 2024). Thus, restatement refers only to those rare misstatements that auditors failed to detect during the audit process and it can be taken more as evidence of low-quality audits than earnings quality metric (Barton et al., 2024).

In our paper, we exploit almost unique institutional framework which requires Croatian listed companies to publish both pre-audit and audited annual financial statements. Therefore, we are able to investigate which pre-audit financial indicators are significantly related to accounting misstatements detected by independent statutory audit, i.e. audit adjustments. These pre-audit misstatements occur much more frequently than the restatements and they are mainly related to the client's characteristics and not to the auditor's quality as restatements. Contrary to the previous restatement studies that are focused only on misstatements not detected by auditors, our research goal is to investigate those misstatements that auditors detected and adjusted during the year-end audit. Further, we analyse not only earnings misstatements but also misreporting related to working capital and fixed assets.

Our empirical results provide evidence that financial statements with high value of absolute residuals from the Dechow-Dichev accrual model modified by McNichols (2002) have higher probability of containing material misstatements of net income, working capital or fixed assets. Beside accrual quality variable, size and debt ratio are also significant predictors of accounting misstatements.

Our research contributes to the literature in several ways. First, prior research on accounting misstatements usually relies on restatements samples that are unbalanced and contain only a few misstatements that auditors failed to detect. Our focus is set on misstatements which have been detected during the audit process and that occur much more frequently but these misstatements have not been previously analysed due to the fact that pre-audit data and audit adjustments are usually not publicly available. Second, a major disadvantage of using SEC Accounting and Auditing Enforcement Releases (AAERs) or other samples that contain financial restatements is that many firms that manipulate earnings are likely to go unidentified as SEC has a limited budget, so it selects firms for enforcement action and does not investigate all firms (Dechow et al, 2011). Therefore, a selection bias may limit the generalizability of estimated results. We address this issue by using a sample of pre-audit financial statements that are all

subsequently audited, so we can correctly classify those pre-audit financial statements for which auditors detected material misstatements from those that did not have any audit adjustment. Also, by including the audit opinion variable in our model, we can control for effects of those firms that did not accept proposed audit adjustments. Third, in contrast to previous empirical studies that generally use binary variable whether financial statements contain misreporting or do not, we distinguish misreporting regarding net income, working capital and fixed assets.

The remainder of the paper is organized as follows. Section 2 provides literature review and theoretical background. Section 3 describes our sample and research design. Section 4 presents empirical results and section 5 concludes the paper.

2 Background and literature review

Most previous studies on predicting accounting misstatements focus on data from enforcement actions by the SEC for allegedly misstating financial statements and on related detailed information in the Accounting and Auditing Enforcement Releases (AAERs) (Song et al., 2016).

Barton et al (2024) have reviewed 103 recent papers (published from 2016 to 2021 in top six accounting journals) using restatements as dependent variable and concluded that almost exclusively all papers estimate the probability of misstatement using traditional probit and logistic regression. Beside probit and logistic regression methodology, the most recent studies use machine learning methods to detect misstatements (Bertomeu et al., 2021; Brown et al., 2020) but almost all these studies follow the pioneering approach from Beneish (1997 and 1999) studies.

Beneish (1999) identified 74 AAERs firms and matched the sample to 2,332 non-manipulating firms from Compustat database in order to develop a probit model termed M-score model. The results indicated that the probability of manipulation increases with unusual increases in receivables; deteriorating gross margin; decreasing asset quality; sales growth and increasing accruals.

Based on Beneish (1997; 1999) research, Dechow et al (2011) conducted a detailed analysis of 2,190 AAERs between 1982 and 2005 and identified firms with misstated earnings. They investigated various characteristics of misstating firms and found that at the time of misstatements, accrual quality is low; financial and non-financial measures of performance are deteriorating, and financial and off-balance-sheet activities are more likely to occur. Furthermore, they provided evidence that modified Jones model of discretionary accruals has less predictive power than working capital accrual models. Finally, they developed composite measure of the probability of manipulation (F-score).

Even though we build our research on Beneish (1997; 1999) and Dechow et al (2011) approach, our main goal is not to estimate the most accurate predictive model rather than to test the usefulness of accrual quality measures in detecting accounting misstatements. Namely, a large body of literature assumes that earnings are mostly manipulated through the accrual component of earnings (Dechow et al., 2011). Therefore, we assume that firms with high value of accruals (i.e. low accrual quality) will be positively related to misstatement probability.

3 Sample and research design

In order to examine the relationship between accrual quality and accounting misstatements, we first form two groups of firms based on criteria of material audit adjustment on net income, working capital or fixed assets.

We obtain necessary research data from the Zagreb stock exchange (Croatian capital market). Listed firms on Zagreb stock exchange are required to prepare their financial statements in accordance with IFRS. Also, firms need to first publish pre-audit financial statements for the last quarter of the financial year along with available cumulative date for the entire year and afterwards firms make public their audited financial statements. In this way, we are able to hand-collect and pair pre-audit and audited financial statements for all firms listed on Zagreb stock exchange from 2009 to 2018. Our sample consists of 931 pairs of pre-audit and audited firm-year observations but, due to missing data, when we calculate all variables, our final sample has 437 observations. By comparing pre-audit and audited financial statements, we can calculate differences, i.e. audit adjustments. Audit adjustments can be taken as evidence that a specific pre-audit financial statement line was misstated.

Table 1 provides details on accounting misstatements, i.e. audit adjustments. Panel A shows descriptive statistics on working capital adjustments (Rel_WC_diff), fixed assets adjustments (Rel_FA_diff) and net income adjustments (Rel_NI_diff) scaled by the average audited total assets. Panel B presents binary variables for material misstatements, which takes value of 1 if the absolute difference between audited and pre-audit item divided by average total assets is higher than 0.5% and zero otherwise.

Table 1. Audit adjustments

Panel A: Audit adjustments					
Variables	N	Mean	Std. Dev.	Min	Max
Rel_WC_diff	437	0.016	0.043	0	0.655
Rel_FA_diff	437	0.012	0.044	0	0.630
Rel_NI_diff	437	0.009	0.028	0	0.312
Panel B: Material audit adjustments					
Variables	N	N (adj)	% (adj)	N (no adj)	% (no adj)
NI_diff	437	99	22.7%	338	77.3%
WC_diff	437	163	37.3%	274	62.7%
FA_diff	437	97	22.2%	340	77.8%

Note: See Table 2 for variable definitions.

As it can be seen from Table 1, misstatements on the sample of pre-audit data occur much more frequently than on restatements samples, which usually contain only a few misstatements. In our sample, 22.7% of pre-audit financial statements contain material misstatements on net income and 37.3% on working capital.

Our main explanatory variables are accrual quality-related variables since they are traditionally used to capture earnings manipulations (Dechow et al., 1996; Song et al., 2016). Accruals are generally defined as the difference between the net income and the operating cash flow. Since earnings are the sum of accruals and operating cash flows, earnings can be manipulated through both accruals and cash flows. However, extant literature presents evidence that managers primarily misstate earnings *via* the accrual component of earnings, since it is easier and cheaper than *via* cash flows (Mendes et al, 2012). We expect that pre-audit financial statements with material misstatements will have higher values of absolute total operating accruals (Abs_TA) or accrual components (Change in accounts payable - *Chg_AP*; Change in accounts receivable- *Chg_AR*;

Change in inventory- Chg_INV ; Other accruals - Oth_Acc). As a main measure of accrual quality, we use absolute value of residuals (Abs_DDres) from the Dechow-Dichev model modified by McNichols (2002):

$$\Delta WCA_{ijt} = \beta_0 + \beta_1 CFO_{ijt-1} + \beta_2 CFO_{ijt} + \beta_3 CFO_{ijt+1} + \beta_4 \Delta REV_{ijt} + \beta_5 GPPE_{ijt} + e_{it} \quad (1)$$

Where ΔWCA are changes in working capital accruals, CFO are net cash flows from operations, ΔREV is the change in revenue, and GPPE is gross property, plant and equipment.

Beside accrual quality variables as our main variables of interest, we include a number of different variables as control variables based on Dechow et al (2011) paper. These variables represent financial performance (Return on assets – ROA ; Net cash flow from operating activities - CFO ; Sales growth – $Sales_G$); non-financial performance (Securities issuance – $Issue$); and stock market performance (Debt ratio – DR ; Size; Current ratio – CR). Finally, since our misstatement data is based on audit adjustment, we include $Big4$ variable to control for potential differences in audit quality and $Opinion$ variable to control for effects of those firms that did not accept proposed audit adjustments. Therefore, to test whether accrual quality is associated with the likelihood of misstatement, we estimate the following traditional logistic regression model:

$$P(\text{Misstate}) = \beta_0 + \beta_1 Big4_{it} + \beta_2 Opinion_{it} + \beta_3 DR_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Sales_G_{it} + \beta_7 CR_{it} + \beta_8 Chg_AP_{it} + \beta_9 Chg_AR_{it} + \beta_{10} Chg_INV_{it} + \beta_{11} Oth_Acc_{it} + \beta_{12} Abs_DDres_{it} + e_{it} \quad (2)$$

Where dependent variables are probability of net income misstatement (NI_diff), working capital misstatement (WC_diff) or fixed assets misstatement (FA_diff). Definitions of all variables are provided in the Table 2.

Table 2: Variables description

Variable	Description
NI_diff	Net income adjustment, 1 if the absolute difference between audited and pre-audit net income divided by average total assets is higher than 0.005 and zero otherwise
WC_diff	Working capital adjustment, 1 if the absolute difference between audited and pre-audit working capital divided by average total assets is higher than 0.005 and zero otherwise
FA_diff	Fixed assets adjustment, 1 if the absolute difference between audited and pre-audit fixed assets divided by average total assets is higher than 0.005 and zero otherwise
Big4	1 if a firm hires a Big 4 audit firm, and zero otherwise
Opinion	Auditor's opinion, equals 1 if the firm's auditor issued a modified opinion and zero otherwise
Leverage	Total liabilities divided by total assets
DR	The debt ratio binary variable, 1 if a Leverage variable is higher than 0.8 and zero otherwise
Size	The natural logarithm of total assets
CFO	Net cash flow from operating activities from the cash flow statement scaled by average total assets
ROA	Return on assets, net income scaled by average total assets
Sales_G	Sales growth, total sales in year t divided by total sales in year t-1
CR	The current ratio, current assets divided by current liabilities
Issue	Securities issuance, equals 1 if the firm issued securities during year t, and zero otherwise
Abs_TA	Absolute total operating accruals, calculated as net income minus net cash flow from operating activities from the CF statement divided by average total assets
Chg_AP	Change in accounts payable scaled by average total assets
Chg_AR	Change in accounts receivable scaled by average total assets
Chg_INV	Change in inventory scaled by average total assets

Oth_Acc	Other accruals, calculated as total operating accruals (TA) minus <i>Chg_AR</i> minus <i>Chg_INV</i> plus <i>Chg_AP</i> plus <i>depreciation</i>
Abs_DDres	The absolute value of the residuals from the Dechow-Dichev model modified by McNichols (2002) for each year using all firm-year observations in the same one-digit SIC code on pre-audit data based on estimated parameters obtained from audited data.

4 Results

In this section, we first describe differences in financial characteristics between firms with and without accounting misstatements. After that, we conduct correlation analysis and finally, we develop our logistic regression model to test the association between accrual quality and probability of misstatement.

Table 3 presents information regarding the differences in pre-audit characteristics between firms with and without misstatement on net income (Panel A); on working capital (Panel B) and on fixed assets (Panel C). Estimated results show that firms with misstated net income have lower level of operating cash flow (CFO); lower size (Size); higher absolute total accruals (Abs_TA), higher debt ratio (DR) and lower accrual quality (i.e. higher value of Abs_DDres). Also, these firms are more likely to hire non Big-4 auditor and to have qualified audit opinion. Our main research variable - accrual quality (Abs_DDres), the absolute value of the residuals from the Dechow-Dichev model modified by McNichols (2002), is also significantly different between firms with and without misstatements on working capital (Panel B) and on fixed assets (Panel C).

Table 3. Differences in pre-audit characteristics between firms with audit adjustments and without audit adjustments

Panel A: Net income audit adjustments

	N (no adj)	N (adj)	Mean (no adj)	Mean (adj)	Dif	t value	p value
CR	338	99	2.550	1.637	0.913	1	0.329
Leverage	338	99	0.505	0.539	-0.035	-0.7	0.476
ROA	338	99	0.004	-0.015	0.018	1.7	0.087
Sales_G	338	99	1.177	1.316	-0.138	-0.5	0.617
Issue	338	99	0.006	0.010	-0.004	-0.45	0.658
CFO	338	99	0.040	0.020	0.020	2.15	0.034
Abs_TA	338	99	0.060	0.080	-0.020	-2.25	0.025
Opinion	338	99	0.245	0.394	-0.148	-2.9	0.004
DR	338	99	0.074	0.182	-0.108	-3.2	0.002
Size	338	99	20.088	19.564	0.524	3.8	0
Oth_Acc	338	99	-0.004	0.013	-0.016	-1.15	0.245
Chg_AP	338	99	-0.002	0.003	-0.005	-0.3	0.776
Chg_INV	338	99	0.002	0	0.002	0.3	0.770
Chg_AR	338	99	-0.002	-0.008	0.007	0.75	0.453
Big4	338	99	0.346	0.202	0.144	2.75	0.007
Abs_DDres	338	99	0.037	0.053	-0.017	-3.15	0.002

Panel B: Working capital audit adjustments

	N (no adj)	N (adj)	Mean (no adj)	Mean (adj)	Dif	t value	p value
CR	274	163	2.769	1.627	1.143	1.4	0.158
Leverage	274	163	0.485	0.558	-0.072	-1.75	0.081
ROA	274	163	0.003	-0.007	0.010	1.05	0.291
Sales_G	274	163	1.044	1.486	-0.442	-1.85	0.064
Issue	274	163	0.007	0.006	0.001	0.15	0.887
CFO	274	163	0.037	0.033	0.004	0.45	0.640
Abs_TA	274	163	0.058	0.076	-0.018	-2.45	0.015

Opinion	274	163	0.256	0.319	-0.064	-1.45	0.153
DR	274	163	0.091	0.111	-0.019	-0.65	0.516
Size	274	163	20.145	19.674	0.471	3.95	0
Oth_Acc	274	163	0.009	-0.013	0.022	1.85	0.062
Chg_AP	274	163	0.005	-0.011	0.015	1.15	0.260
Chg_INV	274	163	-0.001	0.005	-0.007	-1.1	0.266
Chg_AR	274	163	-0.002	-0.005	0.004	0.55	0.584
Big4	274	163	0.340	0.270	0.070	1.5	0.131
Abs_DDres	274	163	0.036	0.048	-0.012	-2.55	0.011

Panel C: Fixed assets audit adjustments

	N (no adj)	N (adj)	Mean (no adj)	Mean (adj)	Dif	t value	p value
CR	340	97	2.548	1.625	0.923	1	0.327
Leverage	340	97	0.495	0.571	-0.075	-1.55	0.120
ROA	340	97	0.000	-0.003	0.003	0.25	0.802
Sales_G	340	97	1.048	1.776	-0.729	-2.65	0.009
Issue	340	97	0.009	0	0.009	0.95	0.354
CFO	340	97	0.036	0.035	0.001	0.15	0.899
Abs_TA	340	97	0.062	0.074	-0.013	-1.4	0.155
Opinion	340	97	0.274	0.299	-0.026	-0.5	0.623
DR	340	97	0.100	0.093	0.007	0.2	0.834
Size	340	97	20.017	19.800	0.218	1.55	0.122
Oth_Acc	340	97	0.003	-0.009	0.013	0.95	0.355
Chg_AP	340	97	0.001	-0.006	0.006	0.4	0.689
Chg_INV	340	97	0.000	0.007	-0.007	-1	0.326
Chg_AR	340	97	-0.003	-0.003	-0.001	-0.05	0.962
Big4	340	97	0.327	0.268	0.059	1.1	0.275
Abs_DDres	340	97	0.037	0.054	-0.017	-3.15	0.002

Note: See Table 2 for variable definitions.

Correlation analysis is conducted in Table 4. Pearson's correlation coefficients are presented below the diagonal, while Spearman's rank correlations are above the diagonal. Results indicate significant correlation (both Pearson and Spearman) between misstatements on net income and variables: Big 4 audit firms (*Big4*); debt ratio (*DR*); accrual quality (*Abs_DDres*) and *Size*.

Table 4. Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12
NI_diff	1.000	-0.130	0.152	0.156	-0.171	0.106	0.032	-0.046	-0.025	-0.035	-0.055	-0.039
Sig.		0.006	0.002	0.001	0.000	0.027	0.508	0.333	0.598	0.462	0.254	0.415
Big4	-0.130	1.000	-0.074	-0.098	0.398	-0.016	0.039	-0.011	0.008	0.081	0.043	0.218
Sig.	0.006		0.121	0.041	0.000	0.732	0.415	0.816	0.867	0.089	0.369	0.000
DR	0.152	-0.074	1.000	0.124	-0.073	0.027	0.098	-0.069	-0.040	-0.058	-0.262	-0.345
Sig.	0.002	0.121		0.010	0.127	0.568	0.040	0.153	0.405	0.225	0.000	0.000
Abs_DDres	0.149	-0.097	0.182	1.000	-0.088	0.042	-0.017	-0.002	-0.084	-0.155	-0.117	0.002
Sig.	0.002	0.043	0.000		0.068	0.385	0.716	0.972	0.079	0.001	0.014	0.963
Size	-0.179	0.414	-0.077	-0.069	1.000	-0.036	0.056	0.123	0.007	0.084	0.155	0.067
Sig.	0.000	0.000	0.107	0.153		0.449	0.247	0.010	0.888	0.078	0.001	0.164
Oth_Acc	0.056	0.069	-0.014	-0.111	0.006	1.000	0.498	-0.051	-0.012	0.006	-0.017	-0.095
Sig.	0.245	0.148	0.776	0.020	0.901		0.000	0.283	0.805	0.894	0.730	0.048
Chg_AP	0.014	0.082	0.116	-0.108	0.080	0.619	1.000	0.206	0.269	0.168	-0.088	-0.183
Sig.	0.776	0.087	0.015	0.024	0.095	0.000		0.000	0.000	0.000	0.065	0.000
Chg_INV	-0.014	-0.037	0.113	-0.085	0.006	-0.363	0.014	1.000	0.125	0.227	0.236	0.102
Sig.	0.770	0.437	0.018	0.076	0.897	0.000	0.769		0.009	0.000	0.000	0.034

Chg_AR Sig.	-0.036 0.453	0.001 0.980	-0.046 0.340	0.094 0.049	0.058 0.231	0.019 0.684	0.325 0.000	-0.194 0.000	1.000	0.317 0.000	0.193 0.000	0.032 0.507
Sales_G Sig.	0.024 0.617	-0.033 0.494	-0.029 0.542	0.014 0.777	0.049 0.309	-0.035 0.461	0.167 0.000	0.181 0.000	0.242 0.000	1.000	0.265 0.000	0.047 0.323
ROA Sig.	-0.082 0.087	0.017 0.731	-0.302 0.000	-0.078 0.102	0.065 0.174	0.000 0.995	-0.296 0.000	-0.016 0.733	0.229 0.000	-0.003 0.958	1.000	0.394 0.000
CR Sig.	-0.047 0.328	-0.024 0.618	-0.076 0.113	0.028 0.556	-0.065 0.173	-0.023 0.625	-0.026 0.581	-0.008 0.863	0.043 0.366	0.006 0.897	0.055 0.252	1.000

Note: See Table 2 for variable definitions. Pearson's correlation coefficients are below the diagonal, while Spearman's rank correlations are above the diagonal.

Finally, we estimate parameters of logistic regression model from the equation 2. Our dependent variable is one of the following: probability of fixed asset misstatement (model 1); probability of net income misstatement (model 2); or probability of working capital misstatement (model 3). The results are reported in Table 5.

Table 5: Logistic regression model

	Expected sign	(1) FA_diff	(2) NI_diff	(3) WC_diff
Big4		-0.099 (0.298)	-0.341 (0.321)	0.234 (0.258)
Opinion		-0.013 (0.282)	0.347 (0.271)	0.085 (0.244)
DR		-0.461 (0.457)	0.668* (0.381)	-0.123 (0.378)
Abs_DDres	+	8.013*** (2.498)	5.355** (2.478)	5.941** (2.39)
Size		-0.155 (0.114)	-0.284** (0.121)	-0.378*** (0.104)
Oth_Acc	+	-0.748 (1.749)	2.679 (1.812)	-1.788 (1.628)
Chg_AP	+	0.368 (1.695)	-1.239 (1.735)	0.263 (1.576)
Chg_INV	+	0.51 (2.483)	1.233 (2.638)	-0.106 (2.443)
Chg_AR	+	-1.452 (2.098)	0.427 (2.151)	-1.684 (1.956)
Sales_G		0.288 (0.23)	0.042 (0.046)	0.351 (0.246)
ROA		0.061 (1.678)	-1.351 (1.698)	-0.22 (1.554)
CR		-0.032 (0.036)	-0.016 (0.021)	-0.037 (0.028)
Intercept		1.789 (2.405)	3.729 (2.525)	6.701*** (2.199)
Observations		437	437	437
Pseudo R ²		0.054	0.091	0.070
Area under ROC curve		0.628	0.708	0.668
Hosmer-Lemeshow goodness-of-fit chi		6.24 (0.620)	1.38 (0.995)	5.02 (0.755)

square (sig.)

Pearson chi square (sig.)	432.28 (0.247)	437.23 (0.217)	430.6 (0.288)
Correctly classified	78.57%	77.80%	66.82%
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes

Note: See Table 2 for variable definitions.

Results presented in Table 5 indicate that estimated models are overall statistically significant with Pseudo R² from 5.4% to 9.1%. Goodness of fit and explanatory power of models are also appropriate. Area under ROC curve is from 0.63 to 0.71 and from 67% to 79% cases are correctly classified. Hosmer and Lemeshow test as well as Pearson chi square test suggest that the model fits the data well. Also, we include year and industry fixed effects in all the models.

Estimated results indicate that accrual quality variable (*Abs_DDres*) is positively related to probability of misstatements in all three models, as predicted. This means that firms with higher value of *Abs_DDress* (i.e. lower accrual quality) are more likely to misstate their financial statements. Beside accrual quality variable, size and debt ratio are also significant predictors of net income misstatements.

5 Conclusion

This paper investigates the relationship between accounting misstatements and accrual-based measures on the sample of pre-audit financial statements of Croatian listed firms. Our results indicate that firms with high value of absolute residuals from the Dechow-Dichev accrual model modified by McNichols (2002) are more likely to contain material misstatements of net income, working capital or fixed assets. Beside accrual quality, size and debt ratio are also significant predictors of accounting misstatements.

Our paper contributes to prior studies by analyzing pre-audit accounting misstatements which have been detected by independent statutory audit. These misstatements occur much more frequently than misreporting on restatement samples but they have not been previously analysed due to the fact that pre-audit data and audit adjustments are usually not publicly available. Beside for researchers, our results and conclusions should also have important implications for regulators, auditors and capital providers. Auditors and regulators could benefit from our findings to develop better risk models and to enhance their ability to identify potential misreporting in pre-audit financial statements. Investors, banks and other capital provider could improve their decision-making process by assessing the risk of misreporting more accurately.

6 References

- BARTON, F. J., BURNETT, B. M., GUNNY, K., and MILLER, B. P. (2024). The importance of separating the probability of committing and detecting misstatements in the restatement setting. *Management Science*, 70(1), 32-53.
- BENEISH, M. D. (1997). Detecting GAAP violation: Implications for assessing earnings management among firms with extreme financial performance. *Journal of accounting and public policy*, 16(3), 271-309.
- BENEISH, M. D. (1999). The detection of earnings manipulation. *Financial Analysts Journal*, 55(5), 24-36.

- BERTOMEU, J., CHEYNEL, E., FLOYD, E., and PAN, W. (2021). Using machine learning to detect misstatements. *Review of Accounting Studies*, 26, 468-519.
- BROWN, N. C., CROWLEY, R. M., and ELLIOTT, W. B. (2020). What are you saying? Using topic to detect financial misreporting. *Journal of Accounting Research*, 58(1), 237-291.
- DECHOW, P. M., GE, W., LARSON, C. R., and SLOAN, R. G. (2011). Predicting material accounting misstatements. *Contemporary accounting research*, 28(1), 17-82.
- DECHOW, P., GE, W., and SCHRAND, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of accounting and economics*, 50(2-3), 344-401.
- DECHOW, P. M., SLOAN, R. G., and SWEENEY, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary accounting research*, 13(1), 1-36.
- FARBER, D. B. (2005). Restoring trust after fraud: Does corporate governance matter?. *The accounting review*, 80(2), 539-561.
- KIM, Y. J., BAIK, B., and CHO, S. (2016). Detecting financial misstatements with fraud intention using multi-class cost-sensitive learning. *Expert systems with applications*, 62, 32-43.
- MCNICHOLS, M. F. (2002). Discussion of the quality of accruals and earnings: The role of accrual estimation errors. *The accounting review*, 77(s-1), 61-69.
- MENDES, C. A., RODRIGUES, L. L., and ESTEBAN, L. P. (2012). Evidence of earnings management using accruals as a measure of accounting discretion. *Tékhné*, 10(1), 3-14.
- SONG, M., OSHIRO, N., and SHUTO, A. (2016). Predicting accounting fraud: Evidence from Japan. *The Japanese Accounting Review*, 6(2016), 17-63.
- XU, F., and ZHU, Z. (2014). A Bayesian approach for predicting material accounting misstatements. *Asia-Pacific Journal of Accounting & Economics*, 21(4), 349-367.