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EARNINGS MANAGEMENT AS A CONSEQUENCE OF INCOME TAX REFORMS: THE CASE OF CROATIAN MANUFACTURING COMPANIES

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ABSTRACT

This study explores the behavior of Croatian manufacturing companies in the context of the income tax reforms that have been implemented twice in the last ten years (2016 and 2020). The research sample comprises 4,649 (2016 reform) and 4,651 (2020 reform) manufacturing companies. The analysis of the income distribution shows that the companies included in the sample avoid publishing small losses. The same analysis only partially (for the 2016 reform) confirmed downward earnings management to reduce income tax payments. However, the analysis of differences in discretionary accruals based on paired-sample t-tests and Wilcoxon signed-rank tests for both income tax reforms confirmed the expected tax-aggressive behavior of the sampled firms. Namely, firms used earnings management techniques for income shifting from years (2016 and 2020) with higher income tax rates to years (2017 and 2021) with lower income tax rates. The regression results mainly support the existing theory on the other motives of earnings management and confirm the importance of company indebtedness (only for the 2020 reform), financial statement audit, and company size. As a particular contribution of this study, we highlight the evidence that the application of two income tax rates (higher 18% and lower 12% - from 2017; 10% - from 2021) creates additional pressure on downward earnings management for those companies that have to apply a higher income tax rate.

KEYWORDS: *income tax reform; earning management; income distributions; discretionary accruals; Croatia*

1. INTRODUCTION

The main aim of this study is to examine the impact of the tax reform (the reduction of the income tax rate) and other relevant factors on earnings management practices in a sample of Croatian manufacturing companies. With the Croatian income tax reform of 2016, the income tax rate was reduced from 20% (until December 31, 2016) to 18% (for companies with an annual turnover of €398,168 and more) and 12% (for companies with an annual turnover of less than €398,168) from January 1, 2017. As the reform was passed by the Croatian Parliament - Sabor - on 2 December 2016, companies had enough time to adjust their accounting policies and estimates to minimize income tax payments for 2016. The reduction in the income tax rate resulted in a shift of income from the year in which the higher income tax rate applies (2016

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- 20%) to the year in which the lower income tax rates apply (2017 - 18% and 12%). An additional reform of income tax from 2020 reduced the lower income tax rate from 12% to 10% (from January 1, 2021), while the income threshold for the higher tax rate (18%) was raised from € 398,196 to € 995,421. Due to the income tax reform from 2020, there is also an incentive to shift income from 2020 to 2021.

Although much of the research has confirmed that income tax is an important determinant of earnings management practices, some recent studies such as Callao et al. (2020), Sánchez-Ballesta & Yagüe (2020) and Delgado et al. (2023) question some or all of the earlier findings. A review of the earnings management literature shows that income tax is not the only driver of earnings management. Therefore, to gain a comprehensive insight into this accounting phenomenon, it is necessary to include additional relevant competing independent variables (leverage, audit, size, etc.) in the modeling. In order to investigate the phenomenon of earnings management due to income tax reforms in Croatia, several research questions were posed. First, does earnings management exist in Croatian manufacturing firms? Second, have the Croatian income tax reforms led to a profit shift from a year with a higher income tax rate to a year with a lower income tax rate? And finally, are there a number of explanatory variables besides income tax that explain the extent of earnings management? The answers to these questions may be of practical use to tax authorities, auditors and creditors.

This paper contributes to the existing scientific literature in several ways. Although research on earnings management is very common in developed countries (USA, UK, Germany, Belgium, Netherlands, Spain, Sweden, etc.), such empirical studies are still rare in Central and Eastern European countries. Callao et al. (2020) analyzed 180 papers from the period 1981-2012 and found that most papers deal with US data (55%), while 36 papers (20%) use data from EU countries. The remaining papers were from China and other Asian countries. Of the total 180 articles, only five articles refer to Central and Eastern European (CEE) countries. Vagner et al. (2021) report that 1,547 articles on earnings management were published in the Web of Science database between 1988 and 2019. Gokhale & Pillai (2024) analyzed 96 articles from Q1 and Q2 Scopus journals (period 2003-2021) and reported that the largest number of studies is available for China (31 studies), while of the CEE countries only Poland is represented with 2 studies.

Our own insight into the relevant citation databases (Web of Science, Scopus and Google Scholar) for the last five years has shown that the number of publications on earnings management in CEE countries has increased (Siekelova et al. 2020; Callao et al. 2020; Kliestik el al. 2020; Valaskova et al. 2021; Kliestik el al. 2022). However, there was only one study for Croatia (Degiannakis et al. 2019) that confirmed the existence of earnings management in a sample of Croatian-listed companies by analyzing distributions and observed discontinuities around zero earnings. According to the available literature, our study is therefore the first to address tax-driven earnings management in Croatia. In contrast to a number of previous studies that use data from listed companies, this study uses a sample of predominantly unlisted - private companies. Such a sample leads to significantly different incentives for financial reporting than the sample of listed companies, and it can be expected that the incentives of profit minimization earning management are significantly more pronounced compared to most studies that focus on listed companies.

Furthermore, this paper improves the research methodology by proposing a more precise method to measure the variable of total accruals that takes into account provisions changes. Management has significant discretion over provisions and this accounting policy can be exploited for earnings management. The exclusion of provisions from the accrual calculation can significantly affect the quality of accrual variables (total, discretionary and non-discretionary accruals) and all research results. In contrast to numerous studies that focus only on the identification of earnings management, this study also analyzes a set of competing influence variables that explain the differences in the extent of earnings management for the manufacturing firms included in the sample. Finally, the original contribution of this study is to demonstrate that a tax system with two income tax rates (one higher and one lower) creates additional pressure on downward earnings management for those firms that have to apply a higher income tax rate.

Empirical findings related to income distribution show that firms avoid disclosing small losses, with some evidence of downward earnings management related to income tax reduction. Analysis of differences in discretionary accruals for both income tax reforms suggests income shifts aimed at permanent income tax savings. Estimated regression models corroborate the existing knowledge on the other earnings management factors and confirm the importance of company indebtedness, financial statement audits and company size. The results of this study have several practical implications. Tax authorities need to be aware that private companies are likely to use tax reform to achieve permanent income tax savings. This information should be taken into ac-

count when forecasting the impact of tax reform on government budget revenues. Auditors must ensure that the accounting techniques used for the expected decrease or increase in discretionary accruals are not outside the bounds of accounting rules. Banks and other creditors should consider the possibility of a significant shift in income in the years surrounding the tax reform when assessing the creditworthiness of their customers.

The study is structured in such a way that the relevant literature on earnings management is analyzed in the second part, with a focus on income tax-oriented studies. The third part describes the data sources, the study sample, the measurement of discretionary accruals and the independent variables. The empirical findings are presented in the fourth part of the study, which is followed by the conclusion.

2. LITERATURE REVIEW

Earnings management is often defined as an attempt by managers to influence reported accounting income in the short term (Schroeder et al., 2014). The range of definitions of earnings management is wide, from those that emphasize opportunism and value destruction to those that emphasize the reduction of information asymmetries and value creation (Gokhale & Pillai, 2024). In terms of legality, earnings management techniques can be within the scope of accounting rules (legitimate) or outside the scope of accounting rules (illegitimate). There are numerous examples of illegitimate earnings management in corporate practice, such as the corporate scandals of Enron, WorldCom, Tyco, Parmalat, Skandia, AIG, etc. The motivation for earnings management practices may be related to executive compensation, management buy-outs, exceeding earnings expectations, debt convents rules, political costs, industry regulations, IPOs, unblocking managerial inside information, income tax reforms, etc. (Healy & Wahlen, 1999; Ronen & Yaari, 2008; Scott, 2015; Sundvik, 2017). More recent studies see the determinants of earnings management in accession to the European Union, Global Financial Crisis – GFC, company size, the company's stock market listing status and industry affiliation (Callao et al., 2020), the Covid crisis (Yan et al., 2022; Aljughaiman, et al., 2023), the quality of corporate governance (Brennan, 2021; Nguyen et al., 2024) and the level of corporate social responsibility (Dimitropoulos et al., 2020; Gonzalez-Sanchez et al., 2023).

The existing literature suggests that the extent of earnings management can be influenced by various factors, some of which are particularly important in the context of listed companies (executive bonuses, beating earnings forecasts, insider information disclosure, etc.). However, certain company characteristics such as size, indebtedness and audit of financial statements can have an impact on earnings management for both listed and unlisted companies. At the same time, the directions of the influence of the independent variables on the extent of earnings management can be completely different. For example, higher corporate debt is expected to cause positive discretionary accruals to give a better picture of the financial health of the company (Sweeney, 1994; DeFond & Jiambalvo, 1994; Dichev & Skinner, 2002; Franz et al., 2014; and Lazzem & Jilani, 2017). On the other hand, conducting an audit of financial statements can have the opposite effect and limit the amount of discretionary accruals (Van Tendeloo & Vanstraelen, 2008; Zisis, & Sorros, 2015; Sundvik, 2016).

The modern literature on earnings management has its roots in the early work of Healy (1985) and DeAngelo (1986). These two studies focused on developing relatively simple models to separate discretionary accruals (a proxy for earnings management) from total accruals. Since then, numerous studies have analyzed the impact of managerial discretion on reported accounting numbers. Over time, several main methodological directions of research have emerged, between which we can distinguish: studies that focus on discretionary accruals as a whole, studies that focus on specific accruals, and studies on the characteristics of income distribution. A significant advance in the methodology for measuring total discretionary accruals is the Jones (1991) model, which for the first time uses regression analysis to separate discretionary accruals from total accruals. According to the Jones model, normal accruals are calculated as a linear function of changes in revenue and the level of property, plant and equipment. Later, the original Jones model was refined by the paper of Dechow et al. (1995), who used the original Jones model in the estimation period, while in the period of the earnings management event, revenues are adjusted for the change in receivables. The proposed approach implies that all changes in receivables are the result of earnings management. Such an approach is not free from flaws as it may overstate discretionary accruals if the company experiences strong growth in revenues and receivables in the event period. Kothari et al. (2005) improve the Jones model by accounting for changes in receivables during the period used to estimate the beta parameters. In addition, Kothari et al. (2005) argue that future company performance is predictable, resulting in a predictable component of future accruals. The discretionary accruals model should include a control for the performance-related component of future accruals. Empirical simulations have shown

that the best control variable for performance is ROA_t.

The total discretionary accruals approach can be found in several studies that have examined the effects of income tax reforms on the behavior of companies. For example, Sundvik (2016), who examines the effects of the income tax reform in Sweden, concludes that total discretionary accruals were largely income-minimizing in 2008 and 2012, the years before the income tax rate was lowered. In a cross-country study based on data from four CEE countries (Poland, Czech Republic, Slovakia and Hungary), Callao et al. (2020) conclude that the tax burden has no statistically significant influence on the level of discretionary accruals. The study shows that the level of discretionary accruals is significantly influenced by the phase prior to EU accession, the Global Financial Crisis - 2008, company size, stock market listing status and industry affiliation. The income tax reform in China in 2007, which reduced the income tax to 25% (from 33%), provided the impetus for research on earnings management (Bai et al., 2021). The results confirmed that Chinese companies used earnings management techniques to minimize income tax payments in anticipation of lower corporate income tax rates. In addition, the reduction in current accruals was greater for private companies than for state-owned enterprises. The methodological peculiarity of this study is that only current accruals were analyzed, not total accruals. Wali (2021) analyzes a sample of listed German and Dutch companies and concludes that accruals were lower in the year before the income tax rate cut (2007 and 2008) compared to other years. Pais & Dias (2022), analyzing a sample of Portuguese micro-enterprises, conclude that a simpler tax system (taxation based on income categories) leads to lower earnings management compared to the traditional tax system (taxation based on accounting profit). The most recent study by Delgado et al. (2023) includes data from Germany, the United Kingdom, France, Italy and Spain from 2005-2016. Using a neural network approach, the authors conclude that there was no manipulation of accruals to reduce tax payments.

Burgstahler & Dichev (1997) have developed an alternative approach to uncovering earnings management based on analyzing the distribution of net income. Their pioneering study reports a discontinuity in the distribution around zero net income, for which explanations can be found in transaction cost theory and prospect theory. According to transaction cost theory, numerous stakeholders (lenders, suppliers, customers, etc.) apply the heuristic cut-off at the zero value of net income when determining the terms of business transactions (interest rate, collateral, payment terms, discounts, etc.). In order to secure the most favorable transaction terms, the company, therefore, applies earnings management techniques to avoid reporting small negative earnings and small reductions in net income. According to prospect theory, the value functions of stakeholders are concave in the area of positive net income and convex in the area of negative net income (S-shaped curve). This leads to the conclusion that the greatest benefit for stakeholders occurs when wealth increases from the area of net losses to the area of net gains. In other words, this theory also suggests that zero net income is the reference point for stakeholder decision making.

A small number of papers used the approach of analyzing net income distributions to identify tax-driven earnings management. The study by Coppens & Peek (2005), which examines the earnings management practices of private companies, is based on the assumption that tax incentives are one of the most important objectives of financial reporting. The authors point out that tax incentives are stronger in countries where financial reporting is more in line with national tax regulations. Empirical evidence (particularly for Belgium and Italy) suggests that companies use income smoothing techniques to avoid disclosing negative net income and high net income, which ultimately results in the largest number of companies being immediately to the right of zero. This finding is somewhat less obvious for companies from Germany and France. Goncharov & Zimmermann (2006) report that Russian companies exploit downward earnings management to reduce their income tax payments. They also conclude that private companies are more aggressive in such earnings management practices than public companies. Marques et al. (2011) examine the same problem using a sample of 6,652 private companies from Portugal. An analysis of the characteristics of the distribution of net income in 2001 and 2002 revealed that private companies avoid disclosing small losses. However, it was found that private companies avoid disclosing larger amounts of net income and engage in earnings management to minimize the income tax burden. Sánchez-Ballesta & Yagüe (2020) examine the characteristics of distributions using a sample of 51,558 firm-year observations over the period 2006-2014. As expected, the discontinuity of the distribution of net profit around zero was confirmed, i.e., a lack of small negative earnings observations and an excess of small positive earnings observations. As far as the tax earnings management of companies is concerned, the empirical results show mixed results. Namely, if the company has no incentive to publish higher net income, it will adjust earnings downwards in order to pay less tax. On the contrary, if the company has previously used earnings management practices to report higher profits, these

incentives are stronger than the incentives to reduce the income tax burden.

Although the income distribution approach is very useful for uncovering earnings management and does not use proxy variables such as discretionary accruals, this approach has its limitations. The first limitation is the fact that it does not attempt to identify how firms implement earnings management. Another limitation is that it does not address the incentives for earnings management, nor does it attempt to identify variables that might explain differences in earnings management (McNichols et al., 2000). Acknowledging that both approaches to uncovering earnings management have certain limitations, for this study we combine both approaches to ensure robust conclusions. The net income distribution analysis aims to uncover earnings management practices in the tax reform period without the use of proxy variables. After that, a switch to the total accruals approach is required to test the difference in the averages of discretionary accruals in the income tax reform environment. Although a large number of empirical studies confirm the hypothesis that income tax is a significant incentive for earnings management, some recent studies (Callao et al., 2020; Sánchez-Ballesta & Yagüe, 2020; Delgado et al., 2023) partially or completely reject such a hypothesis. The existing literature also suggests that income tax need not be the only incentive influencing the extent of earnings management. Therefore, additional relevant competing independent variables should be included in the research model.

3. RESEARCH DESIGN

3.1. Sample description

Early studies on earnings management that focused on total accruals often used time series data and the parameters of the regression models were consequently firm-specific. However, such data sets require a time series of 14 years (Jones, 1991) or 15 years (Guay et al., 1996). Since the Orbis database does not have such a long time series of data, a cross-sectional data set is used for the purposes of this study. Such a dataset means that the parameters of the earnings management model will be industry-specific rather than company-specific. To ensure a more coherent data set, the study is based on data from only one industry - manufacturing. The research sample includes data for Croatian manufacturing companies that were available in the Orbis database in October 2023. The sample included manufacturing companies with a NACE Rev. 2 code from 10 to 32. To exclude inactive companies, an additional selection criterion was an annual income of at least €50,000 in the period 2014-2021. Since income tax in Croatia is based on non-consolidated financial statements, only companies with such financial statements were included in the dataset. In other words, companies that only have consolidated financial statements in the Orbis database were excluded from the sample. Based on the above selection criteria, the research sample comprises 4,649 (2016 reform) and 4,651 (2020 reform) Croatian companies from the manufacturing sector.

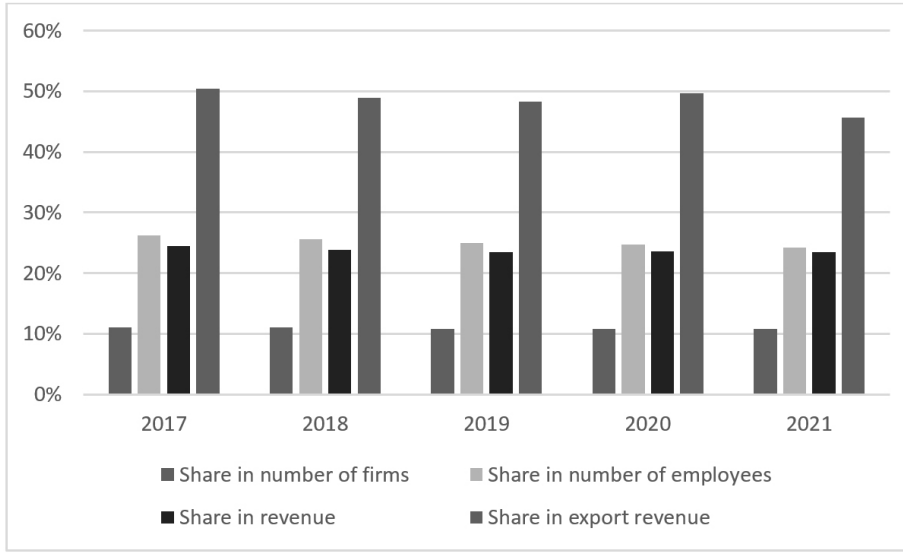

FIGURE 1: Importance of manufacturing sector in Croatian – selected indicators
SOURCE: Fina, Infobiz database

The manufacturing industry is important for every country, especially for a small open economy like Croatia. Manufacturing companies are the main generators of export revenues and contribute significantly to employment, GDP creation and integration into the European and global economy. As they are exposed to international competition, they are forced to constantly improve their productivity, reduce costs and save on income taxes. Figure 1 shows that the share of Croatian manufacturing in the total number of Croatian companies is stable at 11% in the period 2017-2021. The share of the total number of employees decreased slightly from 26% (2017) to 24% (2021). The share of total turnover also fell by 1% in the same period. Figure 1 shows the importance of exports for the Croatian manufacturing industry, which generated around 50% of export revenues in the period 2017-2020, while this share fell to 46% in 2021.

3.2. Research methodology and variables

In view of the research questions raised, the research methodology has several aspects. The first aspect relates to the detection of earnings management by analyzing the characteristics of net income distribution. In line with previous studies, it is necessary to construct distributions of net income considering the optimal size of the net income interval. Considering the theoretical foundations and findings from earlier similar studies, the expectation is that the net income distribution will show a discontinuity around zero, that is, that firms use discretion regarding the disclosure of net income. Consistent with transaction cost theory and prospect theory, firms avoid small losses in particular, which is reflected in a small number of firms in the first interval to the left of zero and a larger number of firms in the first interval to the right of zero. However, since the sample of the study consists mainly of private companies, we assume that the motive of income tax minimization is also important for earnings management. Compared to a listed company, a private unlisted company does not have such a large agency problem as it is often managed directly by the company owners. A private company does not need to signal high profits to investors, while tax incentives for reporting smaller taxable profits may be the most important factor. Consequently, empirical data on the distribution of net profits may also indicate the "migration" of firms from the interval with higher profits to the first interval to the right of zero. The optimal size of the net income intervals (A) is positively related to the interquartile range (IQ difference between the first and third quartiles) and negatively related to the sample size (N) and is calculated according to the approach of Degeorge et al. (1999):

$$A = 2 \times (IQ) \times N^{\frac{1}{3}} \quad (1)$$

The statistical test of the hypothesis about the discontinuity of the distribution of net income around the value zero is based on the τ-statistic of Burgstahler & Dichev (1997), which is approximately normally distributed and is calculated according to the following formula:

$$\tau = \frac{n_a - n_e}{\sigma} = \frac{n_i - (\frac{n_{i-1}+n_{i+1}}{2})}{\sqrt{Np_i(1-p_i)+((N(p_{i-1}+p_{i+1})(1-p_{i-1}-p_{i+1}))/4}} \quad (2)$$

where n_a represents real number of companies in the interval, n_e expected number of companies in the interval, n_i real number of companies in the interval *i*, σ standard deviation of difference, N number of companies and p_i proportion of companies in the interval *i*. In order to avoid the problem of heteroscedasticity, net income is usually scaled by market value, total assets or total revenue. For the purposes of this study, total assets from the period *t-1* are used as a deflator.

The second aspect of the research methodology focuses on measuring and analyzing discretionary accruals and their changes during the event period (years of tax reform). The analysis of previous literature shows two basic approaches to calculate total accruals (TA), the cash flow approach and the balance sheet approach. The first approach can be used when cash flow from operations (CFO) is available or it can be calculated from available accounting data. This approach is common in papers dealing with samples of listed companies that often prepare a cash flow statement and report CFO information. However, if the CFO is not reported and cannot be calculated, there is another way to calculate total accruals, namely the balance sheet approach. The most common balance sheet approach takes into account the change in receivables (ΔREC), inventory (ΔINV), payables (ΔPAY) and depreciation (DEP), according to the following formula (Sundvik, 2016; Kliestik et al. 2020):

$$TA_{it} = \Delta REC_{it} + \Delta INV_{it} - \Delta PAY_{it} - DEP_{it} \quad (3)$$

However, for a more precise calculation of total accruals, we include the change in provisions (ΔPRO) in the formula:

$$TA_{it} = \Delta REC_{it} + \Delta INV_{it} - \Delta PAY_{it} - DEP_{it} - \Delta PRO_{it} \quad (4)$$

Indeed, managers have considerable discretion in setting up provisions and this profit and loss item can be used for earnings management. The exclusion of this element from the calculation of the total ac-

cruals formula can significantly affect the quality of the TA variable and all research results. The evaluation of total accruals (TA) is based on cross-sectional data for Croatian manufacturing companies in the estimation period (two years before the tax reform). To estimate the betas of the earnings management model, we use the performance matching model of Kothari et al. (2005):

$$\frac{TA_{it}}{A_{it-1}} = \beta_0 + \beta_1 \frac{1}{A_{it-1}} + \beta_2 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \beta_3 \frac{PPE_{it}}{A_{it-1}} + \beta_4 ROA_{it} \quad (5)$$

where A is total assets, REV is revenue, REC is receivables, PPE is property, plant and equipment and ROA is the ratio of net earnings to total assets in year *t*. The use of cross-sectional data avoids the assumption that the coefficients for each company *i* are stable over time. The regression parameters β_0 - β_4 obtained by formula (5) are therefore industry-specific and are used to predict the total accruals (non-discretionary accruals - NDA) in the event years (the year of the tax reform and the year after). In the final step, the discretionary component of accruals (DA) is calculated for each company *i* as the difference between the actual accruals in event year *t* (TA according to formula 4) and the non-discretionary accruals (NDA estimated from the earnings management model based on formula 5) in the same year *t*:

$$DA_{it} = TA_{it} - NDA_{it} \quad (6)$$

Consistent with theoretical expectations and the results of some previous studies (Sundvik, 2016; Bai et al., 2021; Wali, 2021), we expect discretionary accruals to be significantly lower in the year with a higher income tax rate than in the first year of application of the lower income tax rate, in which we expect significantly higher discretionary accruals. Such empirical results would suggest that firms use earnings management techniques to shift income from a year with a higher income tax rate to a year with a lower income tax rate. A t-test for equality of two means and a non-parametric Wilcoxon signed-rank test is used to statistically test the difference between discretionary accruals in a year with a higher income tax rate and a year with a lower income tax rate.

The final element of the methodology is regression analysis, which is necessary to identify independent variables (other than income tax) that are expected to influence discretionary accruals. Although most studies (Peek & Coppens, 2005; Goncharov & Zimmerman, 2006; Marques et al., 2011; Sundvik, 2016; Bai et al. 2021; Wali, 2021) have confirmed the tax-aggressive behavior of companies, the results of the recent study by Sánchez-Ballesta & Yagüe (2020) provide evidence that some other variables may also influence earnings management practices. It could be argued that firms that have higher level of indebtedness have a motive for upward earnings management in order to maintain the existing terms (interest, maturity dates, collateral) of credit arrangements or to secure the receipt of new loans. Empirical evidence for such theoretical expectations can be found in the studies by Sweeney (1994), DeFond & Jiambalvo (1994), Dichev & Skinner (2002), Franz et al. (2014) and Lazzem & Jilani (2017). Both theory and empirical results suggest that the leverage variable should positively influence discretionary accruals.

TABLE 1: Description of regression model variables

Variable	Acronym	Measurement
Discretionary accruals	DA	Kothari et al. (2005) approach
Leverage	LEV	Total $Debt_t$/Total $Assets_t$
Audit of financial statements	AUD	Dummy (1 if two of three criteria are satisfied (1. Revenue > 3.98 mil. €; 2. Total Assets > 1.99 mil. €; 3. more than 25 employees); otherwise 0)
Higher income tax rate of 18%	ITR18	Dummy (1 if Revenue ≥ 398,196 € in 2017 and if Revenue ≥ 995,421 € in 2021; otherwise 0)
Company size	SIZE	Ln (Total $Assets_t$)

Van Tendeloo & Vanstraelen (2008) examine the influence of the big four auditors on the extent of earnings management in private, unlisted companies from six countries (Belgium, Finland, France, the Netherlands, Spain and the United Kingdom). The empirical results suggest that the use of the services of the big four auditors has a negative impact on earnings management, but only in countries with a high degree of accounting and tax harmonization (Belgium, Finland, France and Spain). The authors support the empirical results with the theory that the big four auditors have a higher risk of detecting audit errors in countries with high accounting and tax convergence, as the tax authorities have a detailed insight into the financial statements. In such an environment, the big four auditors have a motive to restrict earnings management to protect their reputation. Zisis & Soros (2015) report that Greek private companies with unaudited financial statements engage in aggressive earnings management (upward and downward) compared to companies that use auditing services. In Croatia, the majority of private companies use auditing services due to the legal obligations of the Accounting Act. In such an environment, it is to be expected that the majority of companies will exert pressure on auditors to certify financial statements that are primarily aimed at minimizing the income tax burden. On the other hand, auditors must ensure that the accounting policies and estimates applied are within the legal framework. Considering the theoretical arguments offered and the empirical results of previous studies, we predict a negative impact of audit of financial statements (AUD) on discretionary accruals.

Although it can be assumed that the companies included in the sample follow a tax-oriented approach when reporting accounting income, additional differentiation in incentives for earnings management is also possible due to the differentiation in the income tax rate. With the tax reforms of 2016 and 2020, the uniform income tax rate of 20% was replaced by two income tax rates, one lower (12% or 10%) and one higher (18%). We assume that the application of a higher income tax rate (18%) provides a stronger incentive for downward earnings management compared to the application of a lower income tax rate (12% or 10%). Consequently, we predict a negative sign for the ITR18 dummy variable. Several previous studies have used size as a control variable in modeling earnings management. For example, empirical data for Portuguese private firms show that size has a positive effect on the level of discretionary accruals (Marques et al., 2011). A similar result for private companies from Sweden is published by Sundvik (2016) in the case of tax reforms from 2009 and 2013. Conversely, Van Tendeloo & Vanstraelen (2008) report insignificant signs for size variables in earnings management models for private companies from six European countries.

4. EMPIRICAL FINDINGS

4.1. Income distribution graphical analysis

The first objective of the empirical analysis is to determine whether earnings management existed in the event years, i.e. in 2016 and 2020, when the tax reforms were adopted by the Croatian Parliament - Sabor. In line with studies on income distribution, we expect a discontinuity in income distribution around zero. More specifically, if firms avoid disclosing small losses, then the number of firms in the first interval to the left of zero (I-1) will be lower than expected (according to the normal distribution). At the same time, the number of companies in the first interval to the right of zero (I+1) will be higher than expected, as this interval contains the companies that have "migrated" from the first interval to the left of zero (I-1). In the literature on earnings management, this type of company behavior is usually referred to as "small loss avoidance". The optimal interval range (A) is calculated according to formula (1) and is equal to 0.01.

The empirical results for the 2016 income tax reform from Figure 2 show that the first negative interval (I-1; 0:-0.0099) includes only 32 firms, while the first positive interval (I+1; 0:0.0099) includes as many as 836 firms. Although there is a large difference in the number of companies in the intervals I-1 and I+1, it is necessary to perform a suitable statistical test to determine the statistical significance of the observed difference. Following Burgstahler & Dichev (1997), we calculated the τ-statistic, which yielded the value -27.85 (p-value < 0.001) for the interval I-1. The τ-test confirms that the actual number of companies in interval I-1 is significantly lower than the expected number of companies according to the normal distribution. The τ-statistic for the interval I+1 is 20.57 (p-value < 0.001) and shows that the number of companies in the interval I+1 is significantly higher than expected according to the normal distribution. Such a result is evidence of earnings management aimed at avoiding the reporting of small negative net income, and it is comparable to the results of similar income distribution studies in the USA (Burgstahler & Dichev, 1997; Burgstahler & Chuk, 2017), eight European countries (Coppens & Peek, 2005), Russia (Goncharov & Zimmermann, 2006) and Portugal (Marques et al., 2011).

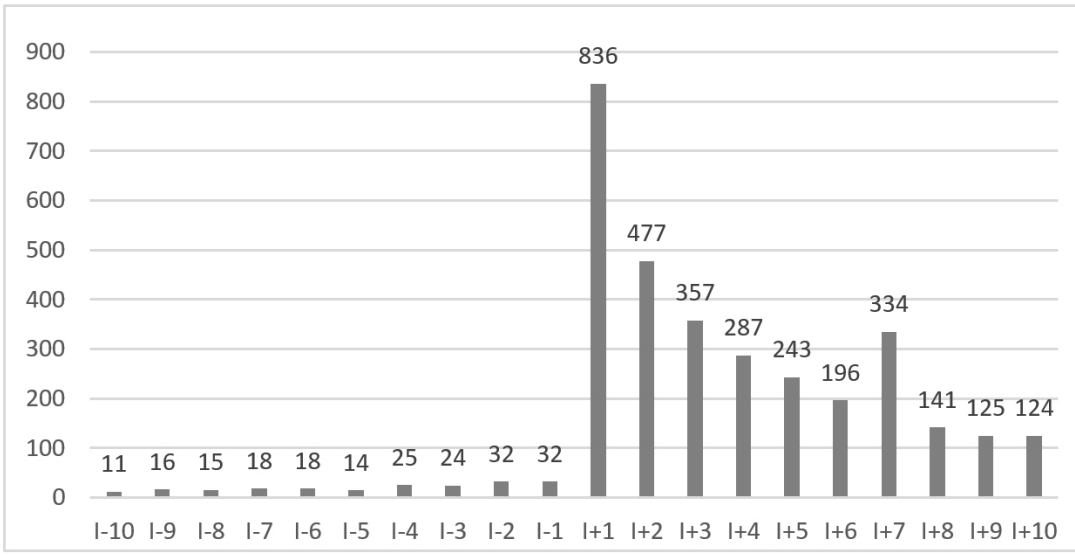

FIGURE 2: Net income 2016* distribution around zero
*Net income variable is deflated by the previous year's total assets (Net income 2016/Total assets 2015)
SOURCE: author's calculations

In contrast to the results from the USA, however, the highest number of observations in the Croatian sample was found in the first positive interval, while the US studies found a high number of observations on the right-hand side of the net income distribution. The paper of Burgstahler & Dichev (1997) shows that the 15th interval to the right of zero contains the largest number of companies, while the work of Burgstahler & Chuk (2017) shows the 11th interval to the right of zero. The largest number of companies in the first interval to the right of zero is not surprising for the sample of the study, as it is a sample of predominantly private companies where there is a strong link between financial reporting and taxation. Such a result is comparable with the results for countries with a strong alignment between accounting figures and taxes (Coppens & Peek, 2006) and with the results of a study for Portuguese private companies (Marques et al., 2011). An additional analysis of the number of companies per interval shows that the number of companies in interval I+2 is significantly lower than expected according to a normal distribution. Namely, the τ-statistic for I+2 is -4.69, with a p-value of less than 0.001. Such a result could indicate that firms from interval I+2 have used earnings management techniques to reduce income tax payments and consequently have "migrated" to interval I+1.

The same analysis of income distribution was repeated for the 2020 income tax reform and led to slightly different results. Figure 3 shows that the first negative interval I-1 (0:-0.0099) comprises only 40 companies, while at the same time the first positive interval I+1 (0:0.0099) comprises 586 companies. The calculated τ-statistic for interval I-1 is -20.95 (p-value < 0.001), which again confirms that the number of companies is significantly lower than would be expected according to the normal distribution. In contrast to the 2016 income tax reform, however, the τ statistic (-1.45, p = 0.147) for the 2020 reform does not confirm the tax-related "migration" of companies from the interval I+2 to the interval I+1.

4.2. Discretionary accrual and income shifting analysis

Now that the analysis of the distribution of net income has confirmed the practice of earnings management, the next step is to examine whether Croatian manufacturing companies have used discretionary accruals to minimize income tax payments. Namely, after December 2, 2016, companies learned about the reduction of the income tax rate from January 1, 2017 and they had enough time to adjust their accounting policies and estimates to reduce income in 2016. Due to the reduction in the income tax rate from 2017, there will probably be shifts in income from 2016 (income tax rate 20%) to 2017 (income tax rate 18% and 12%). Based on the fact that the reaction time of companies to the tax reform was limited to a few months, it is to be expected that the income shift could be realized most easily through discretionary accruals. If the goal of the firms in the sample

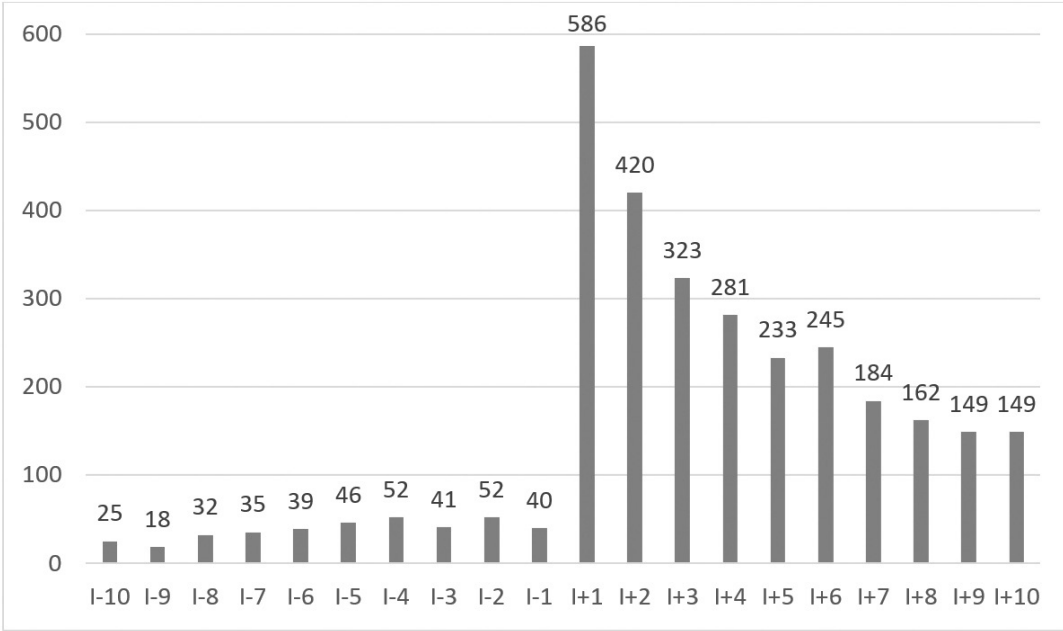

FIGURE 3: Net income 2020* distribution around zero
*Net income variable is deflated by the previous year's total assets (Net income 2020/Total assets 2019)
SOURCE: author's calculations

was income shifting, it is expected that discretionary accruals in 2016 should be statistically significantly smaller (to minimize income) than discretionary accruals in 2017 (to publish shifted income from 2016). For this study, discretionary accruals were calculated using the Kothari et al. (2005) approach. This is because this model for measuring discretionary accruals is based on the modified Jones (1991) model and includes a specific variable – ROA_t - to control business performance. The table 2 shows the average values of discretionary accruals for 2016 and 2017:

In line with theoretical expectations, Table 2 confirms that the average value of discretionary accruals in 2016 is significantly lower than the average value of discretionary accruals in 2017. The absolute difference in discretionary accruals is -0.1479, while the relative difference is -91.4%. For the formal statistical test of the observed difference between the discretionary accruals in 2016 and 2017, a paired sample t-test of two arithmetic means was performed. The calculated t-value is -3.077 (p-value <0.01) and confirms that discretionary accruals in 2016 were significantly lower compared to discretionary accruals in 2017. To ensure robust conclusions, we also performed the non-parametric Wilcoxon signed-rank test. This test also confirms (Z = -3.128; p = 0.002) statistically significant differences between the discretionary accruals in 2016 and the discretionary accruals in 2017.

Similar conclusions were found for the second income tax reform from 2020 (Table 3), as the absolute difference in the average value of discretionary accruals is -0.0465, while the relative difference is -258.9%. The t-value is -13.798 (p-value <0.01), which means that the discretionary accruals in 2020 were significantly lower than the discretionary accruals in 2021. The Wilcoxon signed-rank test revealed (Z = -20.184; p < 0.001) statistically significant differences between the discretionary accruals in 2020 and 2021. The paired-sample t-tests and Wilcoxon signed-rank tests performed for both income tax reforms clearly confirmed the expected behavior of the sampled companies using earnings management for income shifting and minimizing income tax burden.

4.3. Regression analysis

After identifying the earnings management practices of Croatian manufacturing firms in the first two steps of the empirical analysis and finding that discretionary accruals are used to minimize income tax payments, in the final step of the investigation we examine which variables can explain the observed differences in discretionary accruals. The simultaneous analysis of the influence of several independent variables on

TABLE 2: Discretionary accruals descriptive statistics for 2016 and 2017

Variable	Mean	N	Std. Deviation	Std. Error Mean
DA2016	-0.0157	4,649	0.2214	0.0032
DA2017	-0.0009	4,649	0.2181	0.0031

SOURCE: author's calculations

TABLE 3: Discretionary accruals descriptive statistics for 2020 and 2021

Variable	Mean	N	Std. Deviation	Std. Error Mean
DA2020	-0.0179	4,651	0.1553	0.0022
DA2021	0.0285	4,651	0.1581	0.0023

SOURCE: author's calculations

TABLE 4: Descriptive statistics for regression model variables

Variable	2016 reform				2020 reform			
	Minimum	Maximum	Mean	Std. Dev.	Minimum	Maximum	Mean	Std. Dev.
DA	-0.4995	0.4622	-0.0118	0.1480	-0.6608	0.6649	-0.0224	0.1277
LEV	0.0000	1.9171	0.5709	0.2907	0.0000	2.8506	0.5086	0.3108
AUD	0.0000	1.0000	0.1111	0.3143	0.0000	1.0000	0.1353	0.3421
ITR18	0.0000	1.0000	0.5700	0.4951	0.0000	1.0000	0.3538	0.4782
SIZE	2.9349	9.5795	6.1933	1.3990	2.2772	11.3499	6.5075	1.5745

SOURCE: author's calculations

the level of discretionary accruals requires multiple regression. All statistical analyzes for the income tax reforms (2016 and 2020) were performed using IBM® SPSS® 23. Descriptive statistics for the regressand (DA) and the regressor variables (LEV, AUD, ITR18 and SIZE) after removing the outliers (observations with two standard deviations above/below the mean) are presented in Table 4.

The dependent variable (DA - discretionary accruals) represents a proxy variable for earnings management and was calculated according to the performance matching approach of Kothari et al. (2005). DA has negative mean values in both years of the tax reform with low dispersion (0.1480 - 2016 and 0.1277 - 2020). The mean value for the leverage ratio was 0.5709 in 2016 and 0.5086 in 2020, indicating a moderate average debt level in the sample. The financial statements audit dummy variable (AUD) has a mean value of 0.1111, indicating that 11.11% of the sample in 2016 were liable for financial statements auditing (13.53% in 2020). The dummy variable ITR18 shows that a higher income tax rate of 18% affected 57% of the sample companies after the 2016 reform. After the 2020 tax reform raised the threshold for the 18% income tax rate to €995,421, the proportion of companies subject to the higher income tax rate fell to 35.38%. The SIZE variable was based on total assets and was normalized by the natural logarithm. Given the standard deviations of 1.3990 (2016) and 1.5745 (2020), this variable shows the greatest dispersion compared to the other independent variables.

The calculated F-ratios from Table 5 show that both regression models have a good overall fit because F-ratios are significant at the 0.001 level. The explanatory power of the regression models, measured by the adjusted R^2, is 0.039 (model for 2016) and 0.118 (model for 2020). The adjusted R^2 values are comparable to the R^2 values reported in previous

TABLE 5: Regression models for 2016 and 2020 tax reforms

	2016 reform	2020 reform
Dependent variable	DA	DA
Constant	-0.190*	-0.111*
	(0.015)	(0.012)
LEV	0.003	0.026*
	(0.008)	(0.006)
AUD	-0.052*	-0.021*
	(0.009)	(0.007)
ITR18	-0.045*	-0.013*
	(0.006)	(0.006)
SIZE	0.033*	0.013*
	(0.003)	(0.002)
Model significance:		
F ratio	43.165	14.505
Sig.	0.0001	0.0001
Adjusted R^2	0.039	0.118
Durbin-Watson (D-W)	1.96	2.01

NOTES: *p < 0.01. Standard errors are presented in parentheses.
SOURCE: author's calculations

studies on earnings management. For example, Sundvik (2016) reports R^2 values between 0.0001 (2013 model) and 0.022 (2009 model). Sanchez-Ballesta & Yague (2020) report an R^2 range of 0.029 to 0.038, while Pais & Dias (2022) report R^2 values of 0.013 to 0.098. The regression models obtained do not suffer from the problem of multicollinearity, as all Variance Inflation Factors (VIF) are below 5.0. In addition, an inspection of the correlation matrix of the regressor variables for both regression models did not reveal any high values (above 0.8 or below -0.8). Since the values of the Durbin-Watson test are close to 2.0, this means that there is no evidence of autocorrelation of the residuals in either estimated regression model.

The estimated regression coefficients with the debt variable (LEV) only partially confirm the theory that higher corporate debt leads to upward earnings management. This is because although the signs for the LEV variable in the regression models were positive for both years, the LEV was only statistically significant for 2020. In this sense, the empirical evidence is somewhat consistent with previous studies that have confirmed positive and statistically significant influences of debt on earnings management (Sweeney, 1994; DeFond & Jiambalvo, 1994; Dichev & Skinner, 2002; Franz et al., 2014, Lazzem, & Jilani, 2017; etc.). The empirical results suggest that in 2020, the more indebted Croatian manufacturing firms applied upward earnings management techniques. Such a conclusion could not be confirmed for the 2016 reform and can be linked to the Covid crisis in 2020. Under the conditions of the COVID-19 pandemic (lower demand, lower cash inflows and increased need for bank financing), indebted companies were probably more concerned about the continuation of bank financing and geared their accounting policies and estimates towards increasing discretionary accruals. The cost of paying higher income taxes in 2020 was not as important as the benefit of securing bank financing in the case of the more indebted firms.

Evidence of such company behavior during the COVID crisis for Chinese firms is provided by the recent study by Aljughaiman et al. (2023), which shows that distressed firms use upward earnings management techniques based on accruals. Similar findings on upward earnings management are reported by Callao et al. (2020) for companies from CEE countries during the global financial crisis.

Since accounting figures and income tax payments are highly aligned in Croatia, we hypothesize that a sample of predominantly private companies will exert pressure on auditors to certify financial statements that are primarily aimed at minimizing the income tax burden. Table 5 shows that the sign of the financial statement audit variable (AUD) was negative and statistically significant for both tax reforms. This result confirms the hypothesis that the audit of financial statements has a negative impact on earnings management. The negative impact of the audit variable on earnings management is consistent with previous empirical findings for other European countries with a strong alignment between accounting numbers and taxes (Van Tendeloo & Vanstraelen, 2008; Zisis & Sorros, 2015; Sundvik, 2016). Such a finding demonstrates to users of financial statements, particularly banks and other creditors, that unaudited financial statements can be prepared using upward earnings management techniques. In addition, auditors should protect their reputation and in an environment where tax authorities are auditing financial statements, they need to ensure that the applied earnings management techniques are within the legal framework.

The income tax reforms of 2016 and 2020 have led to dual income tax rates. The application of a higher income tax rate (18%) and a lower income tax rate (12% - 2016 and 10% - 2020) is very rare in Europe and allowed us to investigate whether the level of income tax rate affects the extent of earnings management. It was expected that companies anticipating the application of a higher income tax rate would be more inclined to use downward earnings management compared to companies anticipating a lower income tax rate. The negative sign of the variable ITR18 confirms our expectation in both regression models. The empirical results confirm that companies subject to a higher income tax rate of 18% have more incentives to use accounting policies and estimates that lead to more negative discretionary accruals. This result is particularly interesting for tax authorities, as they can assume that companies paying a higher income tax rate (18%) are more likely to use negative discretionary accruals than companies paying a lower income tax rate. Accordingly, they should prepare their tax auditors for such expected corporate behavior. When company size is taken into account, there is a consistent positive effect on discretionary accruals for both income tax reforms. Such a result is comparable to the findings of previous studies by Marques et al. (2011), Sundvik (2016), Callao et al. (2020) and Aljughaiman (2023). Taken together, our regression results essentially confirm the existing theory on earnings management motives and confirm the importance of corporate debt, financial statement audit and company size. As a particular contribution of this study, we highlight the finding that the application of two income tax rates (one higher and one lower) creates additional pressure on downward earnings management for those companies that have to apply a higher income tax rate.

5. CONCLUSION

The income tax reforms in Croatia in 2016 and 2020 provided a solid and unique basis to test tax-led earnings management. Reducing the income tax rate twice in a country with a high degree of alignment of accounting numbers and taxation suggests tax-driven earnings management in a sample of predominantly private companies. From the companies' point of view, a reduction in the income tax rate enables permanent, not just short-term, income tax savings. Permanent savings in income tax payments from such tax reforms can be achieved by shifting income from a year with a higher income tax rate to a year with a lower income tax rate. However, as the existing literature suggests that tax incentives are not the only incentives for earnings management, our study also considered other potentially interesting factors. The analysis of the distribution of net income based on a sample of Croatian manufacturing firms shows that firms engage in earnings management to avoid disclosing a small negative net income. This result is consistent with existing theories and the results of similar studies. However, an additional analysis of the distribution of net income for the 2016 income tax reform found that earnings management in some companies is aimed at minimizing taxable income and income tax payments. The finding that the peak of the distribution of net income is to the right of zero in the first interval (I+1) and moves out of the second interval (I+2) suggests that the tax incentive was an important factor in management discretion in accounting income. However, the data for the 2020 reform did not confirm this tax-induced company migration.

To obtain robust results, we conducted additional research based on total and discretionary accruals. This part of the analysis confirms the theoretical expectations regarding the shift of income from

years with higher income tax rates to years with lower income tax rates. Namely, in the years when the income tax reform was announced and enacted (2016 and 2020), Croatian manufacturing companies used downward earnings management techniques, which was reflected in more negative discretionary accruals compared to discretionary accruals in the first years (2017 and 2021) of applying lower income tax rates. The observed difference between discretionary accruals in the event period was statistically significant for both reforms, confirming the tax-aggressive behavior of Croatian manufacturing companies.

The estimated regression models confirmed most of the theoretical expectations regarding the influence of potential regressor variables on the level of discretionary accruals. The results on the impact of indebtedness on discretionary accruals are mixed, as the leverage variable was not significant in 2016, while it had a positive effect on discretionary accruals in 2020. Such a finding for 2020 can be explained by the COVID-19 pandemic. Under the conditions of the COVID-19 pandemic, the more indebted companies were probably more concerned about the continuity of bank financing and geared their accounting policies and estimates toward increasing discretionary accruals. The sign of the financial statement audit variable was negative, suggesting that the use of audit services constrains and negatively influences earnings management practices. In contrast to other studies, dual income taxation in Croatia allowed us to test the effects of the simultaneous existence of higher and lower income tax rates. The estimated regression model suggests that companies that fall under a higher income tax rate of 18% are more likely to use accounting techniques that lead to a more negative discretionary accrual. Controlling for company size revealed a positive effect on discretionary accruals for both income tax reforms. The robustness of the conclusions on earnings management aimed at minimizing the income tax burden is confirmed by the fact that the results were confirmed for both tax reforms. In other words, Croatian manufacturing companies show consistent tax-aggressive behavior over time.

The results of the estimated regression model have several practical implications for tax authorities, auditors, creditors and other users of financial statements. Namely, when performing various activities and analyzes (tax inspection, auditing activities, assessment of the company's credit risk, etc.), users of financial statements should take into account the fact that larger companies will, on average, try to increase discretionary accruals in order to report better accounting numbers. Similar behavior may be associated with an increase in the company's degree of indebtedness. Indeed, more indebted companies tend to adjust their earnings upwards. Such practices may be particularly common among companies that do not have their financial statements audited, as the external audit would otherwise have a negative impact on the level of discretionary accruals. In this context, however, auditors need to ensure that the accounting policies and estimates used to manage discretionary accruals are not outside the bounds of accounting standards.

This study has several limitations, among which the fact that it is based on a sample from a single industry should be highlighted, which limits the possibility of generalizing the conclusions. As in similar studies, a proxy variable is used to measure earnings management, as this phenomenon cannot be measured with absolute accuracy. Future research could incorporate larger data sets that would allow for greater generalization of the results, as well as examine the influence of a broader range of variables on earnings management practices.

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UPRAVLJANJE DOBITI KAO POSLJEDICA POREZNIH REFORMI: SLUČAJ HRVATSKIH PROIZVODNIH PODUZEĆA

SAŽETAK

Ova studija istražuje ponašanje hrvatskih proizvodnih poduzeća u kontekstu reformi poreza na dobit, koje su provedene dva puta u posljednjih deset godina (2016. i 2020. godine). Uzorak istraživanja obuhvaća 4.649 (reforma 2016.) i 4.651 (reforma 2020.) proizvodnih poduzeća.

Analiza distribucije neto dobiti pokazuje da poduzeća iz uzorka izbjegavaju objavljivanje malih gubitaka. Ista analiza samo djelomično (za reformu iz 2016.) potvrđuje praksu smanjenja dobiti s ciljem smanjenja poreznih obveza. Međutim, analiza razlika u diskrecijskim obračunima, provedena uz pomoć t-testa za sparene uzorke i Wilcoxonovog testa rang-sume, za obje porezne reforme potvrdila je očekivano porezno-agresivno ponašanje poduzeća.

Naime, poduzeća su koristila tehnike upravljanja dobiti za prijenos dobiti iz godina (2016. i 2020.) s višim stopama poreza na dobit u godine (2017. i 2021.) s nižim stopama poreza na dobit. Rezultati regresijske analize uglavnom podržavaju postojeću teoriju o drugim motivima za upravljanje dobiti te potvrđuju važnost zaduženosti poduzeća (samo za reformu iz 2020.), revizije financijskih izvještaja i veličine poduzeća.

Kao poseban doprinos ove studije, ističemo dokaz da primjena dviju stopa poreza na dobit (više od 18% i niže od 12% - od 2017.; 10% - od 2021.) stvara dodatni pritisak na praksu smanjenja dobiti za ona poduzeća koja podliježu višoj stopi poreza na dobit.

KLJUČNE RIJEČI: *reforma poreza na dobit; upravljanje dobiti; distribucija neto dobiti; diskrecijski obračuni; Hrvatska*