Charles University

Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

Is Revenue Management to Meet Earnings Benchmarks Informative?

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently; using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, April 26, 2020

Signature

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Abstract

We propose and empirically test a new hypothesis that managers rationally choose between specific channels of earnings management to meet earnings benchmarks. Prior research documents that managers are ready to interfere with the neutrality of financial reporting process to report earnings above zero, earnings above last year's earnings, and earnings above analysts' forecast. However, there is a controversy over whether this earnings management to meet or beat earnings benchmarks is intended to distort investors' view by delaying the disclosure of bad news or whether it is intended to communicate managers' private information about the firm's strong future performance. We argue that the credibility of the earnings management signal crucially depends on the cost of its imitation. As revenue management is more costly to imitate than cost management, we argue that managers who intend to send a credible signal about their firm's future performance likely boost revenues rather than depress costs. To test this prediction, we use a recently developed model of discretionary revenues that is arguably more powerful in detecting earnings management than traditional techniques. The empirical results are consistent with our predictions for the most important earnings benchmark – the consensus of analysts' earnings forecasts – and they are weaker for the less prominent earnings benchmarks. We provide some evidence on the use of revenue management to meet or beat last year's earnings, and no evidence on the use of revenue management around the zero earnings threshold. Taken together, our results contribute to the information economics and financial accounting literatures by documenting managers' rational choice between earnings management channels around the most important earnings benchmark, which implies that inflated earnings in those settings communicate managers' private information rather than obfuscate the firm's current performance.

JEL Classification	G32, C58, M41
Keywords	Earnings Benchmarks, Earnings management, Discretionary Revenues

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Abstrakt

Navrhujeme a empiricky testujeme novou hypotézu, že manažeři racionálně vybírají mezi konkrétními kanály správy zisků, aby splnili cíle ziskovosti. Předchozí výzkum dokumentuje, že manažeři jsou ochotni zasahovat do neutrality procesu přípravy finančních výkazů, aby vykázali nenulové zisky, nárůst zisků oproti loňskému roku a zisky nad prognózou analytiků. Není však shoda na tom, zda je cílem tohoto řízení zisků pro splnění nebo překonání specifických cílů zkreslení pohledu investorů zpožďováním informací o špatných zprávách, nebo zda má za cíl sdělovat soukromé informace manažerů o silné budoucí výkonnosti firmy. Tvrdíme, že důvěryhodnost signálu správy zisků zásadně závisí na nákladech jeho imitace. Vzhledem k tomu, že u řízení příjmů je napodobování dražší než u řízení nákladů, tvrdíme, že manažeři, kteří hodlají vyslat věrohodný signál o budoucím výkonu své firmy, pravděpodobně zvýší příjmy spíše než sníží náklady. K testování této predikce používáme nedávno vyvinutý model diskrečních příjmů, který je pravděpodobně lepší v detekci řízení zisků než tradiční techniky. Empirické výsledky jsou v souladu s našimi očekáváními pro nejdůležitější cíl zisků - konsenzus předpovědí ziskovosti analytiků - a jsou slabší pro méně prominentní cíle. Poskytujeme částečné důkazy o využití správy výnosů k dosažení nebo překonání loňských zisků ale žádné důkazy o používání správy výnosů kolem nulového zisku. Celkově naše výsledky přispívají k literatuře i informační ekonomii a literatuře finančního účetnictví zdokumentováním racionální volby manažerů mezi kanály správy zisků kolem nejdůležitějších cílů, což znamená, že nadhosnocené příjmy v těchto případech slouží především ke komunikaci soukromých informací manažerů spíše než zatajení současné výkonnosti firmy.

Klasifikace	G32, C58, M41
Klíčová slova	Cíle zisků, Manipulace se zisky, Abnormální výnosy

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Acronyms

CHANGE AR - Year to year change in accounts receivables

CHANGE R - Year to year change in revenues

JUST MEET - Dummy variable equal to 1 if firm just met earnings target in that fiscal year

BEAT - Dummy variable equal to 1 if firm beat earnings target in that fiscal year

SIZE - Natural log of the firm's total assets

AGE - Natural log of the years in COMPUSTAT database plus one year

AGE_SQ - Square of AGE

GRRP - Industry-median-adjusted positive growth rate in revenues

GRRN - Industry-median-adjusted negative growth rate in revenues

GPM - Industry-median-adjusted gross profit margin

GPM_SQ - Square of GPM

ADJ CFO - Industry-median adjusted cash flow from operations

ADJ ROA - Industry-median adjusted return on total assets

MTB - Market to book ratio

Z-SCORE - Mackie-Mason modified version of Altman's z-score

EM - Dummy variable equal to 1 if firm-years are suspect of using earnings management

Master's Thesis Proposal

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Defense Planned:	June 2020

Proposed Topic:

Is Revenue Management to meet Earnings Benchmarks informative?

Motivation:

The actions of management of firms that just met earnings benchmarks has been widely discussed in the literature. Earnings benchmarks are defined as earnings floors for a specific accounting period bellow which the firm's earnings should not descend. In literature, three earnings benchmarks are particularly popular – zero or last year's earnings (i.e. Roychowdhury, 2006; Caylor, 2010; Gunny, 2010 or Al-Shattarat et al., 2018) and analyst's earnings forecast consensus (i.e. Roychowdhury, 2006; Stubben, 2006 or Caylor, 2010). Clearly, the management will be keen on meeting these benchmarks since the failure to do so could lead to the negative reaction of the market, reducing the firm's value, harming the owner's wealth and subsequently lowering the compensation of the managers. Given this incentive, many authors argue that some of the firms that just met earnings benchmarks on average employed some methods of earnings management (i.e. Burgstahler and Eames, 2006; Stubben, 2006; Roychowdhury, 2006; Caylor, 2010; Gunny, 2010; Cohen and Zarowin, 2010; Al-Shattarat et al., 2018)

Even though many authors suggest that meeting or beating earnings benchmarks tends to be associated with upward earnings management, there is a controversy over whether the inflated earnings are aimed to be deceptive for investors (i.e. Roychowdhury, 2006 or Cohen and Zarowin, 2010) or informative (i.e. Gunny, 2010 or Al-Shattarat et al., 2018). The key distinction between informative and deceptive earnings management is that while informative earnings management should signal managerial private information about the good future firm performance, deceptive earnings management is intended to mislead markets about future performance. Hence, if earnings management is informative it should be positively associated with the future operating performance. In case of deceptive earnings management, we should not observe association with future performance at all or it should be even negative.

There is a sequence of conclusions that leads to a believe that revenue management should be used as informative in the context of meeting or beating earnings benchmarks. Firstly, I identify myself with the conclusion of Marquardt (2004) that revenue management is on average more expensive than expense management – there are high cost connected to earnings restatements (loss of firm's value, litigations, negative press…) when earnings manipulation is detected and according to Feroz et al. (1991) more than 70% enforcement actions of SEC was against manipulation of revenues.

Furthermore, even if the manipulation is not detected it bears certain costs in the future – reversals in the accounting that lead to either lower future revenues or higher future expenses. These reversals tend to appear faster and be distributed into lower number of future periods in case of revenues (Marquardt, 2004). Hence, the negative effect of revenue manipulations is expected to be more severe in the short run (i.e. compare the effects of premature revenue recognition and misleading depreciation schedule in time) and rational managers should use it only if they are sure that in the near future, the performance will be good enough to offset these negative impacts. Also, rational investors should be aware of this fact and therefore the usage of revenue management should be more efficient in the signaling of the managerial private information to the markets.

Based on discussion above I conclude that revenue management is more efficient in signaling the bright future of the company since higher revenue growth is more likely to be more persistent in time compared to expense cutting and because usage of revenue management has higher impact on near future relative to the expense management. However, in my bachelor thesis (Habetinek, 2018) I found that revenue management around SEOs have negative effect on future performance (and therefore is manipulative). I explain this phenomenon by the game theory implications – SEO is a classic example of non-repetitive game (once in many years) and meeting earnings benchmark is an example of repetitive game (each year). Hence, around SEOs managers do not need to think about the near future and are motivated to enhance the value in one point of time as much as possible while in the context of earnings benchmarks managers need to think about the impending negative consequences of the earnings management.

My conclusion from previous paragraph is indirectly supported by past research on real activities management (although none of the papers use argumentation like I do). Cohen and Zarowin (2010) argued that real activities management is more harmful than accrual management (note the parallel to my discussion of revenue vs. expense management) and that its occurrence around SEOs is negatively correlated with the future operating performance while Gunny (2010) showed that real activities management is positively correlated with future operating performance in the context of meeting earnings benchmarks. Applied to the discussion of revenue vs. expense management, revenue – the relatively more expensive form of earnings management – is expected to have negative impact on future performance around SEOs but positive impact (hence informative character) when just meeting or beating earnings benchmarks.

Study of Jiraporn et al. (2006) already proposed a way of distinguishing between informative and manipulative earnings management using agency theory perspective – they claim that firms with better corporate governance should respect the interest of owners and hence use informative rather than manipulative earnings management. This thesis has the ambition to build on this finding and the research of revenue manipulation (specifically Marquardt, 2004; Stubben, 2006; Caylor, 2010 and Stubben 2010) to show that managers rationally select the channels through which the earnings management to meet earnings benchmarks is conducted and that management via revenues implies informative earnings management when just meeting or beating earnings benchmarks.

Hypotheses:

1. Hypothesis #1: Firms that just met common earnings benchmarks on average exhibit positive discretionary revenues.
2. Hypothesis #2: There is positive association of revenue management to meet earnings benchmark and operating performance in the subsequent periods.
3. Hypothesis #3: The positive association of revenue management to meet common earnings benchmark and operating performance in the subsequent periods is stronger for firms with high growth opportunities.

Methodology:

DATA

- Financial data will be obtained from COMPUSTAT database
- Analysts forecasts will be obtained from split-unadjusted I/B/E/S Detail File**.**

JUST MEET FIRMS IDENTIFICATION

I intend to apply a method of just meet firm's identification quite common in the literature (i.e. Roychowdhury, 2006; Gunny, 2010 or Al-Shattarat et al., 2018). For example, firms that just meet analysts' forecast will be identified as follows: subtract actual earnings from forecasted earnings and divide it by total assets at the beginning of the period, firms that just meet (JUST_MEET) analysts' forecasts are defined as those whose scaled earnings deviations are greater than zero but less than 0.01, furthermore, firms that will have scaled earnings deviations greater than 0.01 will be classified as BEAT and firms that will have scaled earnings deviations lower than 0 but greater than -0.01 will be classified as JUST_MISS. Just meeting other benchmarks will be defined in analogous way.

ABNORMAL REVENUES MODELLING

As the primary model of abnormal revenues modification of Stubben's (2010) conditional revenue model, adjusted by adding dummy variable identifying firms suspected of revenue management usage will be applied:

$$\Delta AR_t = \alpha + \beta_1 * \Delta R_t + \beta_2 * \Delta R_t * SIZE_t + \beta_3 * \Delta R_t * AGE_t + \beta_4 * \Delta R_t * AGE_{SQ_t} + \beta_5 * \Delta R_t * GRR_{P_t} + \beta_6 * \Delta R_t * GRR_{N_t} + \beta_7 * \Delta R_t * GRM_t + \beta_8 * \Delta R * GRM_{SQ_t} + \beta_9 * JUST\_MEET_t + \beta_{10} * JUST\_MISS_t + \beta_{11} * BEAT_t + \varepsilon$$

where AR is change in account receivables, R is change in revenues, SIZE is the natural log of total assets, AGE is the natural log of the firm's age in years, AGE_SQ is its square, GRRP(N) is the positive (negative) industry-median-adjusted growth rate in revenues, GRM is the industry-median-adjusted gross profit margin and GRM_SQ its square. Variables JUST_MEET, JUST_MISS and BEAT are a dummies identifying firms that just meet, just missed and beat earnings benchmark, respectively, created by the procedure described above.

Abnormal revenues are defined as the residuals from the models. For my first hypothesis to be true, I need the effect of JUST_MEET to be significant and positive.

MODELS OF INFORMATIVNESS/MANIPULATIVNESS

To test the second hypothesis, I will apply methodology inspired by Gunny (2010. In this testing framework the future performance of a firm is measured via industry-median-adjusted return on assets or industry-median-adjusted cash flow from operations (one of the main indicators of firms' value generating potential and cash generating potential). In my thesis, following model will be applied:

$$CFO_{t+i} = \alpha + \beta_1 * BEAT_t + \beta_2 * JUST\_MISS_t + \beta_3 * JUST\_BEAT_t + \beta_4 * EM_t + \beta_5 * JUST\_BEAT_t * EM_t + \beta_6 * ROA_t + \beta_7 * SIZE_t + \beta_8 * MTB_t + \beta_9 * ZSCORE_{t-1} + \varepsilon_t$$

where ROA is the industry-median-adjusted return on assets, CFO is the industry-median-adjusted cash flow from operations, variables JUST_MEET, JUST_MISS and BEAT are a dummies identifying firms that just meet, just missed and beat earnings benchmark, respectively, created by the procedure described above, EM is a dummy variable that is equal to 1 if the residual from abnormal revenues model is in the highest quintile and 0 otherwise, control variables are ROA (the industry-median-adjusted return on assets at time t), SIZE (natural log of total assets), MTB (market to book value ratio), ZSCORE (Altman's z-score) and GIX (index of the corporate governance quality created by Gompers, Ishii and Metric; 2003).

The purpose of this model is to estimate the effect of just beating the benchmark and at the same time exhibiting evidence of revenue management (beta 5) after controlling for initial profitability (ROA), size effect (SIZE), growth opportunities (MTB), financial health (ZSCORE) – all of them main drivers of firm value hence important for a valid ceteris paribus effect of firms' performance. If the beta 5 will be significant and positive, I will find evidence supporting my second or third hypothesis.

Expected Contribution:

I see three main areas where my diploma thesis contributes to the existing literature.

Firstly and most importantly, my research has the ambition to find evidence that managers are highly rational in the selection of channels through which they manage earnings and that revenue management to meet earnings benchmarks is strictly informative – hypothesis that was never tested before and that cannot be tested using traditional earnings accruals methodology.

Secondly, my research design is using more recent and arguably more accurate model for revenue management estimation (Conditional revenue model - Stubben, 2010) than past researchers that examined revenue management when just meeting earnings benchmarks. Also, the traditional methodology to measure earnings management via earnings accruals (e.g. Healy et al., 1999 or Stubben, 2010),

majority of previous studies might suffer from omitted variable bias. Hence, the methodology applied in this thesis should be superior to the methodologies of most past papers.

Lastly, it enhances relatively scarce view (revenue management) on very interesting and highly relevant topic. In fact, I was able to find only three past papers using the perspective of revenue management in the context of earnings benchmarks – Marquardt (2004) points out the lack of research on earnings management that focuses on specific accounting items (including revenues), however, in case of meeting benchmark, she focuses on non-recurring special accounting items rather than revenues. Stubben (2006) in his paper focused on revenue management while meeting analyst's forecasts and found out that it is implemented mostly by fast-growing and highly profitable firms and Caylor (2010) whose research found out that firms tend to use revenue management in case of meeting analysts forecast, however, he did not found evidence of revenue management used to avoid losses or negative growth.

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Author **Supervisor**

1 Introduction

Extant research documents high market pressures to meet or beat earnings targets (e.g. Huang et al., 2017; He and Tian, 2013 or Mergenthaler et al., 2012) as missing earnings benchmarks is followed by decline of stock market prices and suggests that managers may try to deliberately adjust the results to avoid negative repercussions of missing the market expectations. In line with this conclusion numerous research papers notice that number of firms that just missed earnings target is disproportionally low compared to the number of firms that just met or beaten them (Burgstahler et al., 2006; Brown and Caylor, 2005; Degeorge et al., 1999; Brown, 1997). As an explanation of the anomaly many studies suggest that management of companies that are on the verge of just missing earnings benchmarks will artificially adjust their results by upward-oriented earnings management (e.g. Al-Shattarat et. al, 2018; Sun and Liu, 2016; Zang, 2012; Gunny, 2010 or Roychowdhury, 2006).

Despite the ample empirical evidence on firm's avoidance of small negative surprises it is not clear whether earnings are managed upwards to meet or beat market expectations to obfuscate the firms' economic conditions or to convey valuable signals on managers' private information on the firm's quality. The opportunistic hypothesis suggests that managers' primary aim is to hide poor performance and deceive the markets (i.e. Cohen and Zarowin, 2010; Adut et al., 2011 or Francis at al., 2016). In case the market is unable to fully uncover and adjust for the managed component of earnings they will form too optimistic expectations that will be corrected over time as the poor performance becomes gradually apparent to the market. Thus, under the

opportunism hypothesis, earnings management is negatively associated with the future market and operating performance.

On the other hand, some researchers suggest that the intention of earnings management is not to confuse investors but share with them managers' private information on the firm's future performance outlook (e.g. Gunny, 2010; Zhao et al., 2012 or Al-Shattarat et. al, 2018). This hypothesis suggests that inflating earnings is costly and only firms with a good outlook can afford to do so. Therefore, managing earnings upwards can be viewed as a credible signal of expected strong future performace towards markets used by managers to communicate good news not yet known to investors. Hence, under the signaling hypothesis managers are trying to decrease the information asymmetry and earnings management is positively associated with the future market and operating performance.

There are several ways how managers can artificially improve reported earnings. Most of the papers recognize basic distinction between accrual-based and real activities earnings management. While accrual-based management consists in influencing the reported numbers by exploitation of the flexibility of accounting rules and methods, real activities management is done by managing the operating activity to reach short-term targets. The results of both methods are similar, but the potential costs are different. In case of accrual-based management, the firm can be subject to forced restatements and fines from regulators and sued by investors as the numbers cannot be adjusted arbitrarily despite the flexibility of accounting rules. This is unlikely to happen if the earnings are managed by real activities, but policies implemented to maximise short-term earnings are often associated with destruction of long-term wealth. Researchers in general found evidence of highly rational discrimination between real

activities and accrual-based management (e.g. Sun and Liu, 2016; Ho et al., 2015; Evans et al., 2014; Zang, 2012; Chi et al., 2011 or Cohen and Zarowin 2010) based on their relative costs and benefits. Hence, it is reasonable to assume that managers will behave similarly while selecting specific channels of earnings management as well and thus will aim at reaching their goals with minimal costs.

Prior research provides empirical evidence that investors are more likely to sue firms that overstate revenues compared to those that understate expenses (Palmrose and Scholz, 2004). In addition, financial market regulators are more likely to investigate and demand restatements of revenues than expenses (Feroz, Park and Pastena, 1991). Furthermore, other researchers point out that even detrimental effects of real activities management such as harmed relationship with business partners or changed purchasing behavior of customers induced by expectations of price discounts cannot be compensated as easily as reduced investments in the future (i.e. Roychowdhury, 2006 or Caylor, 2010). Hence, most common real activities expense management such as stopping some investments into the equipment, reducing R&D costs or freezing wages and bonuses are less detrimental to future performance compared to revenue management activities such as channel stuffing or aggressive price discounts (Roychowdhury, 2006 or Stubben, 2006). These findings indicate that revenue management is in general costlier compared to expense management in case of both real activities and accrual-based methods (e.g. Marquardt and Wiedman, 2004; Roychowdhury, 2006; Stubben, 2006 or Caylor, 2010).

While revenue management seem to be more expensive and easier to detect, researchers found empirical evidence that growth in earnings through revenue increases is in general more important for the formation of market expectations

compared to growth through expense decreases (e.g. Rees and Sivaramakrishnan, 2004; Ghosh, Gu, and Jain, 2005 or Jegadeesh and Livnat, 2006). The offered explanation is that revenue growth indicates increasing market demand or market share and is therefore more precise indicator of future growth opportunities compared to enhanced costs management that is more important for mature companies. Hence, we formulate a hypothesis that usage of upward revenue management instead of downward expense management to meet earnings benchmarks should indicate that managers are trying to communicate their private information and not trying to deceive the investors. The logic behind is that managers must consider the relatively high cost on revenue management but also its superior ability to signal expectations of strong future operating performance. Therefore, we expect that managers tend to prefer revenue management when they have favorable private information about their firm performance in the future and to prefer cost management when their intention is to obfuscate earnings announcements and delay the disclosure of bad news. Our main goal in this thesis is to empirically test whether revenue management to meet or beat earnings benchmarks is informative about future operating performance.

Much of the prior research on earnings management is complicated by questionable validity of traditional methods of earnings management estimation – discretionary aggregated accruals and discretionary activities management. Many researchers point out model's misspecification and uncertainty problems of dominant estimation frameworks (see i.e. Healy et al., 1999; McNichols, 2000 or Stubben, 2010) as too many variables have significant effect on earnings. We apply discretionary revenue model which represents contemporary state of the art (e.g. Marquardt and Wiedman, 2004; Stubben, 2006; Caylor, 2010; Stubben, 2010; Edmonds, Leece and Mahler, 2013; Mutlu, 2014 or Gilliam, 2014). This approach is gaining more attention

in the contemporary literature as it answers the reservations voiced against traditional measures of earnings management – high probability of omitted variable bias. Discretionary revenue methodology allows for more powerful and better specified models (e.g. McNichols, 2000 or Stubben, 2010) as it focuses on single element of accounting, thus, limits the number of varibles with significant effect and probability of omitted variable bias.

Our results indicate that in case of consensus of analysts' earnings forecasts, one of three commonly recognized earnings targets in the literature introduced by Burgstahler and Dichev (1997), managers are indeed using upward-oriented revenue management to just meet the target values and that there is positive association of meeting consensus of analysts' earnings forecasts using revenue management and the future operating performance. Hence, we find evidence that revenue management to meet the consensus of analysts' earnings forecasts, earnings benchmark that is believed to be the most important for investors in the contemporary literature as the analysts' coverage increases (Huang et al., 2017; Sun and Liu, 2016 or He and Tian, 2013), is informative about the future operating performance. Furthermore, the association is stronger for firms with higher growth opportunities perceived by financial markets which indicates that our key assumption about superior ability of revenue management to communicate growth opportunities is correct. We find evidence of revenue management used to reach last year's earnings but the positive effect of doing so on the future operating performance is not statistically significant. There is no evidence of firms on average using upward-oriented revenue management to meet zero earnings.

This thesis contributes to the existing literature by providing evidence on the rational choice between earnings management channels that can help investors

discriminate between informative and opportunistic earnings management. We build on prior papers on revenue management to meet earnings benchmarks – Stubben (2006) and Caylor (2010) – that provide evidence of revenue management used to meet consensus of analysts' forecasts but do not examine the implications for subsequent operating performance. Our results are relevant for market regulators, external auditors, financial analysts and other researchers as they provide guidance on how to interpret earnings management through various channels. To our best knowledge, this is the first paper that concludes that investors should interpret inflated revenues to meet consensus of analysts' earnings forecasts as an attempt to communicate private information about firm's subsequent performance rather than an attempt to obfuscate firm's current performance.

The remainder of the paper is organized as follows. Section 2 in detail reviews prior literature and specifies testing hypotheses. In section 3 we discuss the methodology and present descriptive statistics of the data sample. Section 4 presents the empirical results and Section 5 concludes.

2 Literature Review

2.1 Motivation of managers to manage earnings to meet Earnings Targets

Extant literature document highly negative reaction of stock prices when firm miss or even just miss earnings benchmarks (e.g. Huang et al., 2017; Kinney et al., 2002 or Skinner and Sloan, 2002). On the other hand, meeting these earnings targets is associated with stock price increases (see i.e. Bartov et al., 2002; Kasznik and McNichols, 2002 or Lopez and Rees, 2002). Furthermore, failing to meet the benchmarks brings more severe negative effect to the market value of the company compared to the positive effect of beating earnings targets (Huang et al., 2017; Skinner and Sloan, 2002). The asymmetric stock price response implies that managers have incentives to consistently meet these benchmarks over time. To maintain a consistent track record of meeting the benchmarks managers likely prefer to just meet earnings targets rather than beat them by a large margin since doing so might induce higher expectations of market, thus, hindering firm's ability to meet earnings benchmarks in subsequent periods.

The empirically observed highly negative reaction of markets on missing earnings benchmarks (e.g. Huang et al., 2017; Kinney et al., 2002 or Skinner and Sloan, 2002) can be in theory explained by mildly simplified version of model of adverse selection under incomplete information problem on financial markets described in a book written by Tirole (2006) in sections 6.1-6.2 (pages 237-249): Suppose, that a publicly listed firm obtained investment I on a stock market and its operations offer return R. Furthermore, assume that investors believe that with probability α the

company is one of the good firms that reaches the return with given probability p and that there is 1-α probability that the firm is one of the bad firms that reaches the return with given probability q, $q < p$. For simplicity, consider firms with limited liability, in example, return retained by firm $R_f > 0$ in case of success and $R_f = 0$ in case of failure. Under these assumptions the expected profit of the investors is equal to $[\alpha * p + (1 - \alpha) * q] * (R - R_f) - I$.

As the investors determine the value of the company by discounting future cash flows, the market value of a company will be dependent on the size of expected profits. Since the success probabilities are given, the offered return, retention rate and investment are determined ex-ante, the only variable that can induce a shock to the market price of the firm is α – the certainty of investors that this firm is a good one with high probability of success – its reputation among investors. Clearly, missing earnings benchmarks have detrimental effect on market perception of the firm and lowers the expected return, thus, negative stock reaction occurrence is inevitable according to this model.

Managers' motivation to meet earnings benchmarks will be particularly strong since there is empirical evidence that their career prospects and reputation decline (He and Tian, 2013) due to missed common earnings benchmarks. Also, executives who missed earnings benchmarks on average exhibit higher probability of being sued or forced to resign from their current positions (Mergenthaler et al., 2012; Bartov et al., 2002). These empirical findings of researchers are supported by answers from survey among top executive officers who confirmed that meeting or beating last year's earnings, zero earnings and consensus of analysts' forecasts are very important with respect to their business decisions as long as "the impact on future operations will not

be too large" because they are concerned with the subsequent decline of stock prices and the implications for their own career prospects in case of failure (Graham et al., 2005).

The above discussed findings lead to expectation of researchers that managers of publicly listed companies will use their discretion over the firm's accounting and activities to meet earnings targets even when faced with unfavorable firm performance. Consistently with this expectation, previous papers repeatedly observed so called "kink distribution" around the common earnings targets (Burgstahler et al., 2006; Brown and Caylor, 2005; Degeorge et al., 1999; Brown, 1997) using various samples of firms and various time periods. In other words, the number of companies that just missed the earnings benchmarks is disproportionally low compared to the number of companies that met or just beaten the benchmarks. Also, it is much more common to just beat the benchmark than to meet it (Degeorge et al., 1999) which corresponds to the behavior of rational economic agents as earnings are to some extent uncertain until the final moment and the goal to reach positive earnings surprise from the beginning mitigates the possibility of negative earnings surprise even in case of unexpected unfavorable market development. Therefore, prior literature inclines towards the conclusion that executive officers deliberately try to adjust the financial results of publicly traded companies to meet the market expectations.

Even though most studies agree that some actions are taken to prevent negative earnings surprises, there is not complete agreement over how the executive officers are reaching these goals and why they do so. The discussion about how the goals are artificially reached is interesting especially in case of the consensus of analysts' forecasts since its target value is not that rigid compared to the last year earnings and

zero earnings benchmarks. While earnings management is offered by previous research as the only way how to artificially reach last year and zero earnings (e.g. Roychowdhury, 2006) whose target values are arbitrarily set, the consensus of analysts' forecasts can be met either by managing the earnings or by managing expectation of the market itself. A canonical definition of earnings management often used in previous papers is a quote: ''Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting practices.'' (Healy and Wahlen, 1999). This definition is popular since it encompasses the distinction between real activities management (structuring transactions) and accruals management (judgment in financial reporting). Clearly, such practices may be used to artificially meet earnings targets. Even though previous research provides some evidence that executive officers try to manage the analysts' expectation to lower levels (see Huang et al., 2017 or Burgstahler et al., 2006) earnings management remains a dominant explanation of the "kink distribution" of firms around earnings benchmarks provided by researchers (e.g. Sun and Liu, 2016; Roychowdhury, 2006 or Burgstahler et al., 2006).

2.2 Costs of Earnings Management

All forms of earnings management are associated with certain costs. A good understanding of these costs is needed to make predictions about managerial incentives to engage in earnings management. The costs of accrual-based earnings management consist mainly of contingent legal costs arising from regulatory scrutiny and litigations from investors, while the costs of real activities management are derived from harmful

effects on fundamental operations of the company. However, real activities management is not likely to increase legal costs as it is not illegal to make suboptimal business decisions. Therefore, regulators will not punish a company for doing them and investors will face difficult proving of their claims to courts as optimal business decisions are hardly ever arbitrarily identifiable. To quote Cohen and Zarowin (2010) "accrual-based earnings management is more likely to draw auditor or regulatory scrutiny than real decisions, such as those related to product pricing, production, and expenditures on research and development or advertising".

In case of accrual-based management Marquardt and Wiedman (2004) divided the possible repercussions of earnings management into two categories - costs of detected and costs of undetected earnings management. The costs of detected accruals management include punishments from the market regulators (i.e. SEC), forced earnings restatements, subsequent negative coverage in press and decline in the stock prices (Dechow at al., 1996) that may motivate shareholders to sue the company and the managers for mismanagement of their investments (DuCharme et al., 2004). The costs of undetected accruals management consist of its inevitable reversal in the future period resulting in limitations to further creativity in accounting (Barton and Simko, 2002) and in case of deference of the restoration of the normal state of accounts, thus to the cumulation of abnormal accruals, also to the higher probability of detection (Beneish, 1999). Only the detected accrual-based management leads to the increased legal while costs of undetected accrual-based management only seem to limit further creativity in financial reporting as more manipulated numbers are easier to detect. Hence, only detectection of accrual-based earnings management leads to the materilazation of contingent legal costs, therefore, managers should try to limit the probability of detection as much as possible.

The undoubteful harmful effects of real activities management on the future performance of a company are in details discussed by Roychowdhury (2006) who illustrates the implicit costs incurred by the company on two examples. First example are price discounts intended to artificially boost short-term earnings while reducing long-term revenues. Long-term revenues decrease because such pricing policy induces expectations of future discounts and deferred consumption of the company's products and lower profit margins. Second is overproduction to decrease cost of sales by distributing fixed costs on higher number of units produced. This action increases the cost of storage in the future or harms the built-up relations with distributors in case that the storage cost is transferred to them through channel stuffing. Some other costs of real earnings management recently proposed in the literature are for instance worsened safety conditions on workplace caused by lower replacement and training investments or pressure on unrealistic productivity that may lead to a higher number of injuries and subsequent litigations or compensations (Caskey and Ozel, 2017) or lower number of patents and thus products with high income margins as a direct consequence of cutting R&D costs (He and Tian, 2013). The long-term persistence of negative effects induced by real activities management are the main reason why it tends to be more value destroying than accrual-based management (see i.e. Zang, 2012; Cohen and Zarowin, 2010; Taylor & Xu, 2010 or Roychowdhury, 2006).

2.3 Drivers of Earnings Management Choices

Certain factors influencing the market pressures, thus, the motivation of managers to meet earnings benchmarks by managing earnings upwards despite the costs incurred seem to exist as the reactions of stakeholders on missed earnings benchmarks are not homogenous. Recently, many researchers have thoroughly

discussed the influence of financial analysts, especially analysts' coverage, on the behavior of the executive officers of publicly traded companies (e.g. Huang et al., 2017; Sun and Liu, 2016; He and Tian, 2013; Hong and Kacperczyk, 2010; Sun, 2009 or Yu, 2008). Due to the new technologies allowing nearly instant access to information from all around the world, publicly traded companies are currently being followed by many more financial analysts than they were in the past. While all these studies found significant effect of this increased oversight their conclusions are different. Huang et al. (2017) as well as Sun and Liu (2016) or He and Tian (2013) found that increased analysts' coverage is associated with a greater probability that firms will meet or beat earnings benchmarks. They conclude that the increased analysts' coverage intensifies the pressure on meeting the benchmarks as the market reaction on the missed targets will be faster and more severe as a direct consequence of the more efficient processing of the information to the stock price by a larger number of financial analysts. Thus, managers are motivated to manage earnings upwards when they are endangered by negative earnings surprise even more than they were in the past.

In direct opposition to that conclusion is the work of Sun (2009) and Yu (2008) who argue that financial analysts serve as monitors of the managerial activity and, as skilled professionals, they should be able to recognize managerial effort to mislead them. The conclusion therefore is that managerial discretion over firms accounting and activities used to artificially reach earnings targets when the earnings from usual operating activities are insufficient should be restricted by the presence of more intense monitoring and thus higher probability of detection. An alternative explanation of the increased analysts' coverage effects provides the study of Hong and Kacperczyk (2010) which does not aim to explain the reaction of publicly traded companies on the

changed condition, rather it examines the implied changes of the consensus of analysts' forecasts. They argue that the competition among individual analysts increases as the number of analysts following the publicly traded company grows and therefore the motivation to release forecasts as close to reality as possible intensifies as well. Subsequently, the optimistic bias of financial analysts (there is extant literature on this topic available, for some recent research refer to i.e. Baker et al., 2017) that may have made many publicly traded companies unable to reach the market expectations without the usage of earnings management cease to exist. As a result, the ability and motivation of firms to reach the analysts' forecast should be positively affected by this development as found by Huang et al. (2017), Sun and Liu (2016) or He and Tian (2013) and earnings management to avoid negative consequences of not fulfilling market expectations should be scarcer in accordance with findings of Sun (2009) and Yu (2008) since analysts' forecasts should not deviate from reality too much.

Furthermore, improvements of financial reporting standards (e.g. Navarro-García et al., 2014), presence of experienced and qualified external auditors (e.g. Kim et. al, 2003) or enhanced quality of general corporate governance (e.g. Cornett et al., 2008), on average decrease accrual-based earnings management. The explanation offered is based on the increase in expected costs of this type of manipulation arising from these improvements. All these enhancements resulted in the higher probability of earnings management detection. Since detected accrual-based earnings management on average lead to a higher cost than undetected, as the likelihood of detection increases, the expected value of more severe repercussions for the company as well as managers increases appropriately.

However, it seems that the motivation to meet or beat market expectation does not deteriorate with the advances in regulation and supervision (e.g. Huang et al., 2017). Therefore, recent literature suggests that real activities management may serve as the substitute for the accrual-based management under amplified scrutiny of regulators, supervisors and other stakeholders (Sun and Liu, 2016; Ho et al., 2015; Evans et al., 2014; Zang, 2012; Chi et al., 2011 or Cohen and Zarowin 2010). Their findings provide evidence that neither of the discussed developments - improvements of IFRS (Ho et al., 2015; Evans et al., 2014) nor external auditors (Chi et al., 2011) – have significant effect on the overall level of earnings management. The effects of these developments are limited to the changes in composition of earnings management and they tend to shift it in favor of real activities management. Cohen and Zarowin (2010) made more general finding as they presented evidence of a trade-off between accrual-based and real activities earnings management around SEOs and that the final composition is driven by the managers' ability to manipulate accruals. Also, Zang (2012) observes such trade-off and she document that executive officers base their choices of the composition of earnings management on the relative costs of accrual-based and real activities management. Hence, it seems that managers select specific types of earnings management in such a way that minimize the total costs of earnings management while reaching their goals (e.g. Zang, 2012 or Cohen and Zarowin, 2010). We intent to build on these findings and show that managers rationally select also specific channels of earnings management.

2.4 Opportunistic vs. Informative Earnings Management

There are two competing theories explaining managerial motivation to use earnings management to meet or beat earnings targets. The opportunistic earnings management hypothesis suggests that earnings are managed by selfish executive

officers who exploit their information advantage to achieve their private benefit. Therefore, managers who boost current earnings try to delay the revelation of bad news to the market. The theory thus predicts that contemporary earnings management will be associated with decreases in future operating performance. In line with this view Rangan (1998) or Cohen and Zarowin (2010) found an evidence of deteriorating operating performance of firms that showed inclination towards both accrual-based (Rangan, 1998) and real activities (Cohen and Zarowin, 2010) management around SEOs and for example Francis at al. (2016) found negative market price movements of firms that exhibited signs of earnings management to meet or just beat earnings benchmarks in the preceding periods.

On the other hand, the signaling hypothesis suggests that managers use earnings management to communicate their private information about their firm's future performance. The theory suggests that managers bear personal legal and reputation costs when engaging in earnings management. Thus, they will boost earnings only if the benefit of informing the market about the favorable outlook outweighs this personal cost. Under this hypothesis earnings management conveys an informative signal to the market about the firm's future performance. Shivakumar (2000) argues that the earnings management might be a response to market expectations as analysts and investors might include the expected earnings management in the target value setting around SEOs. Tucker and Zarowin (2006) provide evidence of income smoothing rather than manipulating. Taylor and Xu (2010) and Gunny (2010) present evidence that firms that just met earnings benchmark and showed signs of earnings management at the same time do not experience significant adverse effects on future operating performance. Moreover, the association of real activities earnings management and

future performance was found to be even positive (Gunny, 2010) despite all above discussed costs of managing earnings in this way.

In their recent studies, Al-Shattarat et. al (2018) and Zhao et al. (2012) presented rather ambiguous findings. Both studies detected positive association of earnings management and future operating performance on the verge of earnings targets but at the same time found negative association of earnings management and future operating performance in the absence of earnings target beating. Especially these two studies that found such contradicting evidence on one sample of firms, using single methodology of earnings management estimation bring forward the need for some theory that would be able to predict when earnings management tends to be informative about the future performance and when it is deceptive. Such theory would provide some explanation of the conflicting results in the past literature. We aim to address this question in our thesis.

Some papers that identified factors able to predict whether earnings management is informative or opportunistic introduced agency costs as aropriate predictor (e.g. Jiraporn et al., 2006). They argue that if the earnings management was done opportunistically there should be positive association of the earnings management and agency costs while opposite association is expected in case of informative earnings management. Based on their results they conclude that earnings management is in general informative as they found negative association of earnings management with corporate governance index created by Gompers, Ishii and Metrick (2003) as a proxy for agency costs and documented that earnings management is positively correlated with firm value measured through Tobin's q.

However, Jiraporn et al. (2006) examined the relation of earnings management and value of the company in the same period which is fundamental issue as even under the opportunistic earnings management view, the firm value will be positively affected by earnings management in the respective period. Key question is what happens to the firm's value and operating performance in subsequent periods when the market realizes if it has or has not been misled. Habetinek (2018) reproduced the negative association of earnings management and quality of corporate governance as presented by Jiraporn et al. (2006) using the same corporate governance index (Gompers, Ishii and Metrick, 2003) as a proxy and concluded that improvements in corporate governance limit the extent of opportunistic earnings management. However, he also documented significant drop in operating performance in the period after SEOs directly attributable to the upward-oriented earnings management observed in the period of the SEOs. Hence, in contrast with Jiraporn et al. (2006), Habetinek (2018) presented evidence that, in this specific setting, observed earnings management was of opportunistic nature regardless of the agency costs. Moreover, evidence of opportunistic earnings management limited in extent through higher quality of corporate governance but still not informative was found by Adut et al. (2011) in the earnings benchmark meeting setup as well. Hence, agency costs do not seem to be reliable predictor of informativness and opportunism of earnings management. We aim to provide evidence that the choice of the earnings management channel can lead to more reliable predictions, therefore we need to combine findings discussed above with the findings of literature focusing on specific components of earnings management.

2.5 Earnings Management Channels

Executives who want to boost earnings can do so either by artificially increasing revenues (so called "top-line approach") or by decreasing expenses (the "middle-line approach"). Empirical evidence suggests that revenue management is the most common form of earnings manipulations - Feroz, Park and Pastena (1991) documents that 70% of SEC actions in 1980s were taken against premature revenue recognition. This statistic is further supported by Dechow, Sloan and Sweeny (1996) who found on different sample (firm years from 1988-1992) that only premature revenue recognition was a basis for more than 40% of SEC enforcement actions or Wu (2002) whose sample of earnings restatements firm-years was by more than 50% composed of firms that restated prematurely recognized revenues. More recently, Stubben (2010) identified that 173 out of 250 SEC actions were taken against revenue misstatements and Callen et al. (2008) presents 262 cases of improperly recognized revenue restatements out of 521 restatements in total (including non-earnings items). Hence, several researchers identified dominant position of revenue channel, especially premature revenue recognition, of earnings manipulation that does not seem to diminish in time.

The higher occurence of revenue management may be explained by higher interest of market stakeholders in revenues compared to other components of earnings. According to numerous research papers, investors seem to be considering firms that grow through revenue increases as more valuable compared to firms that rely on cost efficiency improvements (e.g. Jegadeesh and Livnat, 2006 or Rees and Sivaramakrishnan, 2004). Ghosh, Gu, and Jain (2005) proposed an explanation of this behavior. They argue that revenue growth is better indicator of future growth opportunities as it indicates increasing market demand or market share while cost-

efficiency improvements are mostly relevant for already mature companies that do not need to invest as heavily into the R&D and other investments needed to future growth, such as advertising. Firms and financial analysts are responding to the greater demand for revenue-related information by increasing the amount of publicly available information about expected and actual revenues. For instance, financial analysts started to issue revenue forecasts together with earnings forecasts more frequently in the recent years (Ertimur et al., 2003; Mutlu, 2014) and also the number of firms that started to include revenue statements to their quarterly earnings announcements increased in the last years - Jegadeesh and Livnat (2006) notice that 95% of firms include revenue disclosures in their earnings announcements and this finding is also supported by more recent studies (e.g. Mutlu, 2014). Hence, we have seen the rise of importance of not only earnings benchmarks but also the formation and growing importance of revenue benchmarks.

Researchers also documented the influence of revenue targets on the stock prices movements - Jegadeesh and Livnat (2006) as well as Rees and Sivaramakrishnan (2004) argue that increases in market prices of companies following positive earnings surprises are greater in case that the firm is subject to positive revenue surprise at the same time, on the other hand, Keung (2010) provide evidence that the negative movements on stock markets following negative earnings surprises are also amplified by the concurrent presence of negative revenue surprise. Furthermore, executive officers seem to have personal motivation to meet or beat revenue targets as Edmonds, Leece and Mahler (2013) found evidence that negative revenue surprises are associated with smaller CEOs bonuses. That may be the reason why the survey of Graham et al. (2005) among top executive officers found out that majority of them include revenues among three most important financial figures while the other two are earnings and

operating cash flow. Consequently, companies became more prone to use revenue channel of earnings management in order to meet both revenue and earnings benchmarks (Edmonds, Leece and Mahler, 2013; Keung, 2010; Jegadeesh and Livnat, 2006; Rees and Sivaramakrishnan, 2004).

Plummer and Mest (2001) document discontinuity of revenues on the verge of revenue targets - similarly to the kink distribution observed by for instance Burgstahler et al. (2006) in case of earnings targets. They interpret their finding as an evidence of upward earnings management by artificially boosted revenues. Marquardt and Wiedman (2004) presented evidence of premature revenue recognition used by firms to increase market value prior Seasoned Equity Offerings. They further found limited evidence of avoiding earnings decreases via managing non-recurring income items. Stubben (2006) examined revenue management in the sample of firms that just met the consensus of analysts' forecasts and presented evidence that firms managed their revenues upwards to avoid negative earnings surprise. Caylor (2010), similarly to Stubben (2006), found evidence of revenue management to prevent negative earnings surprises by failing to meet the consensus of analysts' forecasts but found only limited evidence of revenue management to meet or beat zero or last year earnings. Furthermore, he found that the usage of premature revenue recognition grew to substitute for the lower usage of deferred revenue management following the Sarbanes–Oxley Act in 2002 and Gilliam (2014) in his study presents evidence of revenue management to meet or beat consensus of analysts' forecasts also through alternative forms of revenue management such as order backlog manipulations. Specifically order backlog management is an interesting option as it does not violate GAAP and thus can be used as substitute for in example premature revenue recognition

under the amplified scrutiny of shareholders and analysts. Following these findings, we formulate our first testing hypothesis:

Hypothesis 1 - *Firms that just met common earnings benchmarks on average exhibit positive discretionary revenues.*

Our main goal is to build on past papers and provide evidence that selection of the revenue channel of earnings management to meet earnings benchmarks indicate that managers are trying to communicate their private information about strong future operating performance. Since extant research documents highly rational cost minimizing choices of managers regarding earnings management implementation – both in terms of real activities versus accrual-based management (e.g. Sun and Liu, 2016; Ho et al., 2015; Evans et al., 2014; Zang, 2012; Chi et al., 2011 or Cohen and Zarowin 2010) and composition of specific accruals management (e.g. Marquardt and Wiedman, 2004, Caylor, 2010 or Gilliam, 2014) it is reasonable to assume that managers will exhibit cost minimizing behavior in selection of specific channels of earnings management as well. Hence, we base our main testing hypothesis on cost-benefit analysis of revenue and expense management.

As discussed above, the main costs of accrual-based management materilize when regulatory or legal actions are taken against firms using accruals to manage its earnings. From statistics of SEC enforcement actions (Feroz, Park and Pastena, 1991; Dechow, Sloan and Sweeny, 1996) and statistics of forced earnings restatements (Wu, 2002) we know, that regulatory actions are taken mainly against misstatements of revenues. Furthermore, Palmrose and Scholz (2004) argue that manipulations with revenues are more likely to be subject of litigations. We tend to explain these empirical observations by bias towards revenues which market participants consider as one of

the most important financial figures along with earnings and operating cash flows (Graham et al., 2005). Since revenues are under more intense scrutiny of the regulators and investors, the probability that revenue management will be detected is higher compared to probability of expense management detection. Hence, in line with Marquardt and Wiedman (2004) and Stubben (2006) we argue that revenue is relatively more expensive channel of accrual-based earnings management as the probability of detection and subsequently the expected value of contingent legal costs is larger.

Furthermore, Roychowdhury (2006) and Caylor (2010) suggest that the high relative costs of earnings management via revenue channel are also present in case of real activities management. They argue that channel stuffing, easing credit policies or aggressive discounts will have severe and immediate impact on the subsequent revenues due to borrowing from future and possible losses from bad debts (Caylor, 2010) as well as detrimental effects in the long-run due to lower margins on sales or deferred consumption in the anticipation of further revenue management activities by customers and worsened business relationship with distributors following channel stuffing (Roychowdhury, 2006). Also, Ghosh, Gu, and Jain (2005) point out that majority of revenue management practices require help of someone outside of the organization who will need to be compensated somehow. On the other hand, typical expense management practices such as postponing investments into equipment, decreasing bonusess for employees or limiting R&D expenditures (Roychowdhury, 2006) are mostly done exclusively “in-house” and thus, are associated with internal damages only. We tend to agree with all above mentioned researchers that the external damages induced by revenue manipulation through real activities are harder to compensate for compared to internal damages induced by real activities expense

management which require only increased "in-house" investments in the future and the recovery is not influenced by external parties.

However, we have discussed conclusions of many past papers about the greater relative importance of revenue growth and meeting revenue targets to market stakeholders compared to cost-efficiency improvements as revenue increases are considered to be more precise indicator of future growth opportunities, thus, more important driver of the firm's value (e.g. Jegadeesh and Livnat, 2006; Ghosh, Gu, and Jain, 2005 or Rees and Sivaramakrishnan, 2004). Therefore, revenue management posses one important benefit compared to expense management despite its higher relative costs – it is more efficient in translating the boosted earnings into increased market valuation but also into expectations of strong future performance. While managing earnings upwards, managers must consider the impact of their current decisions on the subsequent operating performance as firm's performance relative to the earnings benchmarks is observed regularly by markets (in case of US publicly listed companies on quarterly basis). Consequently, the high relative costs of revenue management on one side and greater ability to induce expectations of strong subsequent performance become an important factor for decision making as failing to meet future earnings benchmarks would lead to more severe negative market reaction of markets compared to positive reaction of meeting the current benchmarks (Huang et al., 2017; Skinner and Sloan, 2002).

Now, building on our assumption of cost minimizing behavior of managers, we need to understand under which conditions is selection of managing earnings upwards by inflating revenues preffered over depressing expenses. Suppose that managers invested into expensive project and that the investment did not generate as much

revenues as they and other market stakeholders expected in the current year. Also suppose that the project is large and that its insufficient performance prevented to meet earnings targets of the whole company without usage of earnings management. Now imagine two scenarios – first, managers have enough evidence that the poor performance of the project is only temporary and will be much better than expected in the subsequent periods and second, managers have enough evidence that the project was a mistake and will not breakeven. We suggest, that under the first scenario, cost minimizing managers should continue the project and inflate its current revenue stream to meet earnings benchmarks, benefiting from superior ability of revenue management to communicate their private information about the upcoming strong performance of the project while relying on the ability of the project to compensate for the costs of revenue management used. Under the second scenario, we would expect them to end the project to limit the costs incurred and cut other discretionary expenses in order to just meet the current earnings benchmarks and mislead the markets about the true extent of loss on the discontinued project while also minimizing the detrimental effects of earnings management on subsequent performance. Hence, we conclude that revenue management to meet earnings benchmarks should be informative about the future operating performance.

To our best knowledge, no one have ever tested the association of revenue management to meet earnings targets and subsequent operating performance of suspect companies. Therefore, we formulate our main testing hypothesis:

Hypothesis 2 – *There is positive association of revenue management to meet earnings benchmarks and operating performance in the subsequent periods.*

Ghosh, Gu, and Jain (2005) present another interesting finding that market pressures to meet revenue target are higher in case of companies with historically high revenue growths which further supports their arguments in favor of superior ability of revenue increases to indicate future growth opportunities as investors may interpret the slowdown of revenue growth as the early sign of maturity. Similarly, Jegadeesh and Livnat (2006) document higher response of markets on revenue surprise for companies with a history of revenue surprises and Zhao (2010) shows that the demand for revenue growth vary in time. Also, Stubben (2006) argues that growth firms from which market expects revenue growth and firms with high profit margins are subject to higher market pressures to grow via revenue increases. Thus, growth firms are motivated to manage earnings via revenues even more than others. The market should therefore perceive the above expected revenues as a very relevant signal of even higher future growth as every dollar in current revenues multiplies in the future, and it would be irrational to induce such inflation in expectations opportunistically as the future earnings target would become troublesome to reach. Hence, we formulate our third testing hypothesis:

Hypothesis 3 – *The positive association of revenue management to meet common earnings benchmark and operating performance in the subsequent periods is stronger for firms with high growth opportunities.*

3 Research Design

3.1 Meeting Earnings Benchmarks

Crucial prerequisite with respect to our aim is the classification of firm-years according their relative position to earnings targets. The applied method of just meet firm's identification is relatively common in the contemporary earnings management literature (i.e. Roychowdhury, 2006; Gunny, 2010 or Al-Shattarat et al., 2018). It consists of scaling the earnings surprises by size of the firm measured as total assets at the end of the previous year as described by *Equation 1*.

Equation 1 – Firm-years just meeting Earnings benchmark identificaton

$$Scaled\ deviation\ from\ target\ value_{i,t} = \frac{Earnings_{i,t} - Target_{i,t}}{Assets_{i,t-1}}$$

Firms that just meet (*JUST_MEET*) analysts' forecasts are defined as those whose scaled earnings deviations from consensus of analysts' earnings estimates are greater than or equal to zero but less than 0.01 (i.e. less than 1% of total assests), furthermore, firms that will have scaled earnings deviations greater than 0.01 will be classified as *BEAT*. The reason for classification of *JUST_MEET* based on difference of actual earnings from targets in the interval from zero up to one percentage of total assets is that even though managers can temper with accounting, they miss the ability to fine-tune earning precisely to the desired level. Therefore, some of the firms where managers manage revenues upwards will end up at zero and some of them will end up somewhat above zero (Degeorge et al., 1999). On the other hand, *BEAT* variable is included as sometimes firms exceed benchmarks naturally – last year's earnings and

zero earnings in particular, but even analyst's forecasts might be underestimated due to, for instance, unexpected major transaction close to the year-end. If that is the case and firm is beating the benchmark by a large margin without earnings management, it not only looses the motivation to manage earnings upwards, but it becomes motivated to manage earnings downwards to build up reserves for upcoming periods. Therefore, if not treated separately, these firms might significantly distort the results.

3.2 Discretionary Revenue Estimation

Sun and Rath (2010) provided a summary of discussions about weaknesses and relative power of all existing estimation framework. Fundamental problem is that nearly all studies presented in the literature review section used one of only two mainstream approaches. That is something one can expect as it makes results of new papers directly comparable vast number of other researchers. However, it also results in the possibility of common biases present in the literature and this issue represents major point of conflicts in discussions as well.

In case of accrual-based earnings management, prevailing estimation framework is a methodology of abnormal (discretionary) aggregated earnings accruals. This method is based on the idea that accruals can be divided into two categories – those that are attributable to the business reality and accounting standards and those that are abnormal and are attributable to managerial discretion (Dechow, 1994). Baseline idea of such approach is that in fiscal periods where managers are motivated to manipulate earnings, the discretionary aggregated accruals will be correlated with earnings management and thus can serve as its proxy (e.g. Jones, 1991; Dechow, 1994 or Dechow, Sloan and Sweeney, 1995). Discretionary accruals are measurable as residuals from regressions explaining aggregated earnings accruals. The estimation of

earnings management in this stream of literature is dominated by variations of model created by Jones (1991) or the modified version of Jones model introduced by Dechow, Sloan and Sweeney (1995). Despite their popularity, both models have been subject to an extant criticism mostly due to the high number of factors with significant effect on aggregated accruals that make the creation of well-specified model troublesome. As noted by Sun and Rath (2010) "examining accruals can capture the net effect of all accounting choices that a firm made during the period under consideration". Hence, the probability of omitted variable bias present in aggregated accruals models is relatively high. Consequently, their ability to produce reliable results may be hindered.

For example, the modifications of Jones (1991) model made by Dechow, Sloan and Sweeny (1995) were introduced as a response on relatively poor performance of the original model – they found that at an "economically plausible level" of earnings management, although whether 5% of total assets can be considered as a plausible level of earnings management is questionable at least, the Jones model was able to correctly detect earnings management in only 30% of cases. Yet, even the modified version of Jones model was found insufficient in power of detecting earnings management due to the lack of care for the cash flow effects, extreme performance effects and many other factors (see e.g. Bernard et al., 1996; Healy et al., 1999; Kasznik, 1999; Kothari et al., 2005 or Stubben, 2010) and for instance Stubben (2010) argues that the modified Jones model (Dechow, Sloan and Sweeny, 1995) is in fact weaker in power of earnings management detection than the original version (Jones, 1991) using both simulated earnings management - artificially inflating reported figures by 1% - and real world cases of earnings management detected by SEC.

Real activities management estimation is based on the estimated deviation from usual operating activities. In practice these models are similar to accrual-based ones as the changes of operating practices are estimated through implied changes of specific components of accounting (i.e. easing of credit policies leads to increased accounts receivables). There is a higher variety of models and dependent variables generally used, however, in modern research also one specification gained dominant position – models developed by Roychowdhury (2006). However, there is also a discussion about the accuracy of real activities management models, not very different from the already presented arguments. Furthermore, it is much more difficult to detect real activities management compared to accrual-based management for external stakeholders (e.g. Cohen and Zarowin, 2010). Therefore, it is reasonable to assume that such difficulties will be faced by researchers as well. To quote Sun and Rath (2010): "Nevertheless, researchers found it is difficult to detect earnings management through real actions, because there is no benchmark to determine the right actions that managers have taken". Hence, model's uncertainty and misspecification problems are even more likely to occur in case of real activities earnings management models compared to accrual-based ones (Sun and Rath, 2010).

One of the pioneers of specific accruals management estimation framework, Maureen McNichols (2000), discussed the shortcomings and benefits of specific accruals estimation frameworks. She suggests that specific accruals methodology (at that time e.g. McNichols and Wilson, 1988; Scholes et al., 1990 or Petroni, 1992) is likely to underestimate the earnings management as it can by design detect only mismanagement of a very narrow part of the income statement. Subsequent specific accruals literature in general agree with the limitations of this framework. However, great advances were made in specifying models able to detect as large proportion of

earnings management as possible. Unlike early research that was centered on rather unique, highly regulated institutions such as banks (e.g. McNichols and Wilson, 1988; Scholes et al., 1990) and insurance companies (e.g. Petroni, 1992) as well as industry specific accruals (bad debt provisions and claim loss reserves, respectively), contemporary literature aims to estimate earnings management via specific accrual accounts widely used by firms from various industries.

Revenues are a very suitable candidate line item for such estimation since they are reported by firms in all industries, they are significant in volume and their "normal" levels can be modelled with reasonable reliability. Consequently, the narrow focus of specific accruals framework may be also seen as key advantage over aggregated accruals as it can provide more detailed information about channels of earnings management used as well as more reliable results since it is easier to create well-specified model explaining only a narrow part of accounting. Even in her critiqual review of specific accruals methodology McNichols (2000) concludes that, given the great model uncertainty and misspecification problems of aggregated accrual models, "future progress in the earnings management literature is more likely to come from application of specific accrual and distribution-based tests than from aggregate accruals tests". Discretionary revenues models are constructed precisely according to the specific accruals concept.

Stubben (2010) offers a specific methodology for determining discretionary revenues based on the idea that an artificial boost in revenues is likely to be accompanied with an artificial boost in accounts receivables. The intuition is that either revenues from premature revenue recognition or ficticious transactions (accrual-based management) but also from channel stuffing and associated easing of credit policies

(real activities management) are hardly ever collected in cash during relevant period. Thus, focusing on this single component of revenues further decreases the complexity of estimation while preserving majority of relevant information about the possible manipulation of reported figures. Consequently, estimation of revenue management through abnormal accounts receivables should lead to more reliable results that can lead to generalizable conclusions as it should encompass both accrual-based and real activities management (Roychowdhury, 2006, Stubben, 2010).

We implement modified version of conditional revenue model (Stubben, 2010) to evaluate whether firms do or do not manage earnings to just meet earnings targets and to identify the suspect firms for future operating performance evaluation. The model is described by *Equation 2*

Equation 2[1] – Modified conditional revenue model

$$CHANGE\_AR_{i,t} = \alpha + \beta_1 * CHANGE\_R_{i,t} + CHANGE\_R_{i,t} * (\beta_2 * SIZE_{i,t} + \beta_3 * AGE_{i,t} + \beta_4 * AGE\_SQ_{i,t} + \beta_5 * GRR\_P_{i,t} + \beta_6 * GRR\_N_{i,t} + \beta_7 * GRM_{i,t} + \beta_8 * GRM\_SQ_{i,t}) + \beta_9 * JUST\_MEET_{i,t} + \beta_{10} * BEAT_{i,t} + \varepsilon_{i,t}$$

[1] *i* and *t* denotes cross-sectional and time dimension of panel data, respectively, *CHANGE_AR* is change in account receivables, *CHANGE_R* is change in revenues, *SIZE* is the natural log of total assets, *AGE* is the natural log of the number of years since the first occurrence in the database plus one year, *AGE_SQ* is its square, *GRRP(N)* is the positive (negative) industry-median-adjusted growth rate in revenues, *GRM* is the industry-median-adjusted gross profit margin and *GRM_SQ* its square. Variables *JUST_MEET* and *BEAT* are dummies identifying firms that just met and beaten earnings benchmark, respectively, created by the procedure described by *Equation 1*.

it explains changes of accounts receivables (*CHANGE_AR*) as a function of changes in revenues (*CHANGE_R*) and firm's credit policy that should determine the fraction of revenues that will be recorded on accounts receivables rather than collected in cash. Implicit assumption of the model is that all prematurely recognized or artificialy recorded revenues will not be collected in cash, thus, they will distort the relationship and result in increased residuals. Conditional revenue model (Stubben, 2010) follows Callen's (2008) model of credit policy that proxies' standard practices using financial health of the company, it's stage in the business cycle and its operational performance relative to the industry standard. Natural logarithm of total assets (*SIZE*) is used as a proxy of financial strength and in combination with natural logarithm of firm's age in years (*AGE*) and it's square (*AGE_SQ*), *SIZE* is also meant to proxy the firm's stage in the business cycle. Industry-median adjusted positive growth rate in revenues (*GRR_P*), industry-median adjusted negative growth rate in revenues (*GRR_N*) and industry-median adjusted gross profit margin (*GRM*) and it's square (*GRM_SQ*) are included to estimate the operating performance relative to industry competitors. The industry-median adjustment is performed because the operating performance is likely dependent on industry and examination of firms from multiple industries in one panel could bring unnecessary noise to the estimation. However, the dispersion around median value is not expected to be different across industries, thus, industry-median adjustment prevents this risk from materializing. The proxy variables for credit policy are present in the model only in interaction with changes in revenues, as they are meant to determine the fraction of revenues attributable to accounts receivables.

Major difference of our estimation from original paper is the implementation of traditional panel data modeling techniques on firm level instead of Fama and Macbeth (1973) cross section procedure implemented on industry-aggregated level by

Stubben (2010) in order to fully benefit from the structure and richness of our dataset. All necessary statistical tests needed for appropriate selection of the most relevant panel data model is done and reported in the *Empirical Results* section. In our implementation of the model, the industry-median adjustment will be done as follows: group all observations based on Fama and French (2008) 48 industry classification and year of the observation, find median observation per each industry-year cluster and substract the median value from each relevant firm-year observation. We select Fama and French (2008) industry classification since recent study of Li et al. (2019) suggests that it is most appropriate definition of industries that can be done using SIC codes that are available in our dataset. Also, due to the data availability *AGE* will be estimated as natural logarithm of years since the first occurrence in the database plus one additional year. One year is added since the company must have been operating at least one year before entering the database to generate some yearly data. *GPM* is defined as the difference between sales and cost of goods sold divided by total sales.

Our dummy variables *JUST_MEET* and *BEAT* are changing in time; thus, all existing panel data models will be able to evaluate their effects. According to the definition of dummy variables, their coefficients will measure the mean residual for the subset of observation for which the dummy variable is equal to one and its statistical significance. Hence, in order to find evidence of revenue management to meet earnings benchmark (i.e. in favor of *Hypothesis 1*) we need β_9 (effect of just meeting earnings benchmarks) to be positive and statistically significant.

3.3 Future performance

The association of revenue management used to meet earnings targets with future performance is evaluated using difference in differences estimator inspired by

Gunny (2010). The underlying idea of the model is to compare the future performance of firms that just met earnings targets and exhibited evidence of revenue management at the same time to the performance of firms that just met earnings benchmarks without showing evidence of revenue management. Our difference in differences model is described by *Equation 3*.

Equation 3[2] - Future performance model

$$ADJ\_CFO_{i,t+1} = \alpha + \beta_1 * ADJ\_ROA_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * MTB_{i,t} + \beta_4 * ZSCORE_{i,t} + \beta_5 * JUST\_MEET_{i,t} + \beta_6 * EM_{i,t} + \beta_7 * JUST\_MEET_{i,t} * EM_t + \beta_8 * MTB_{i,t} * JUST\_MEET_{i,t} + \beta_9 * MTB_{i,t} * EM_{i,t} + \beta_{10} * JUST\_MEET_{i,t} * EM_t * MTB_{i,t} + \varepsilon_{i,t}$$

The explained variable in our model is industry-median adjusted cash flow from operations (*ADJ_CFO*) in the subsequent period which is indeed robust measure of operating performance as cash flow statement is much more difficult to manipulate compared to the profit and loss statement. We control for past performance using industry-median adjusted return on assets (*ADJ_ROA*) computed as net income divided by total assets at the end of previous period as proxy. The reason for selecting different measures of operating performance as explained and explanatory variables is that by the end of next period, account receivables accrued in the previous period are expected

[2] *i* and *t* denotes cross-sectional and time dimension of panel data, respectively, *ADJ_CFO* denotes industry-median adjusted cash flow from operations, *ADJ_ROA* denotes industry-median adjusted return on total assets, *SIZE* denotes natural logarithm of total assets, *MTB* denotes market-to-book ratio, *ZSCORE* denotes Mackie-Mason (1990) modified version of Altman's z-score described by *Equation 4*, *JUST_MEET* denotes dummy variable identifying firms that just met relevant earnings benchmark that year constructed according to procedure described by *Equation 1* and *EM* is dummy variable identifying firms that are suspect of using earnings management to reach earnings targets.

to be converted into cash. These effects of non-cash income are directly present in *ADJ_ROA*, hence, it is deemed to be more relevant estimator of base operating performance. Industry median adjustment is again done to eliminate the noise generated by inherent heterogeneity of these variables for various industries.

Further, we control for firm's size effect, growth opportunities perceived in the base period and financial health as financially strong firms are more likely to benefit from growth opportunities. We approximate firm's size by natural logarithm of firm's total assets (*SIZE*). The growth opportunities should be reflected the efficient markets in the market capitalization of firms – those for which markets expect significant growth such as Netflix, Amazon or Tesla in general have significantly above average market capitalization relative to the book value of their equity. Therefore, market-to-book value (*MTB*) ratio is included in the regression to account for growth opportunities perceived in base period. Financial health of the company will be approximated using Altman's z-score, an indicator widely used by financial institutions and investors. In this specific application we use computation of Altman's z-score proposed by Mackie-Mason (1990) described by *Equation 4.*

Equation 4 [3]– Altman's z-score model

$$ZSCORE_{i,t} = 3.3 * \frac{NI_{i,t}}{Assets_{i,t-1}} + 1.0 * \frac{R_{i,t}}{Assets_{i,t-1}} + 1.4 * \frac{RE_{i,t}}{Assets_{i,t-1}} + 1.2 * \frac{WC_{i,t}}{Assets_{i,t-1}}$$

[3] *i* and *t* denotes cross-sectional and time dimension of panel data, respectively, *ZSCORE* denotes Mackie-Mason (1990) modified version of Altman's z-score, *Assets* denotes firm's total assets, *NI* denotes net income, *R* denotes revenues, *RE* denotes retained earnings and *WC* denotes working capital.

Variables of interest for our difference in differences estimation are *JUST_MEET* and *EM*. *JUST_MEET* is the same dummy variable identifying firm-years that just met relevant earnings benchmark constructed according to procedure described by *Equation 1*. The *EM* variable is another dummy variable identifying firms that are suspect of using revenues management to reach earnings targets. It is constructed such that for the highest quintile (i.e. top 20%) of residuals from regression described by *Equation 2*, *EM* is equal to 1 and for other observations in the sample it is equal to 0. Such definition of suspect firm-years is in line with contemporaneous literature (e.g. Al-Shattarat et. al, 2018; Gunny, 2010 and others).

Interaction term of *JUST_MEET* and *EM* variables measures the difference between the mean residual of firm-years that just met earnings benchmark without the use of revenue management and mean residual of firm-years that just met earnings benchmark and shown evidence of revenue management at the same time, thus β_7 (effect of the interaction term) may be considered as measurement of the informativeness of revenue management to meet earnings targets about future operating performance. In case β_7 will be positive and significant, we will find statistical evidence that firms, that just met earnings targets using revenue management on average outperformed companies that did not implement earnings management via revenue channel when faced with the possibility of negative earnings surprise, after controlling for the size effect, financial health, deemed growth opportunities and base operating performance. Thus, we will find evidence in favor of *Hypothesis 2*.

Similarly, interaction term of *JUST_MEET*, *EM* and *MTB* variables measures difference between mean residual of firm-years that just met earnings benchmark

without use of revenue management and mean residual of firm-years that just met earnings benchmark and shown evidence of revenue management at the same time while considering the growth opportunities perceived by markets. Hence, β_{10} (effect of the interaction term) can be used to evaluate the effect of growth potential on the strength of the relationship between meeting earnings targets via revenue management and subsequent operating performance. Under *Hypothesis 3* high-growth firms can signal the same level of future operating performance using less revenue management (as in the eyes of markets, every dollar will multiply in the future). Therefore, if level of revenue management is kept fixed (ceteris paribus effect) high-growth firms should on average exhibit better operating performance in the subsequent period. The interpretation of β_{10} is exactly that, thus, if we find significantly positive β_{10} we will find statistical evidence in favor of *Hypothesis 3*.

3.4 Data Sample

Our testing datasets are composed from two main data sources. Most of our variables are obtained from COMPUSTAT financial and market information database that collects data from publicly listed US companies. Analysts' earnings forecasts, namely the arithmetic average of all outstanding earnings estimates for a fiscal period, are obtained from Thompson Reuters I/B/E/S database. These two data sources are merged using CUSIP6 identification number and fiscal year as unique key.

The financial data collected from COMPUSTAT cover time period from 1960 to 2014 and in total includes 283502 firm-years observations for 16569 distinct firms. Market information, specifically market capitalization, are collected for time period from 1985 to 2013 and include in total 106716 firm-years observations for 11478 distinct firms. The I/B/E/S data of mean earnings estimates from financial analysts are

collected for time period from 1982 to 2013 and in total includes 76647 firm-years observations for 9820 distinct firms.

Using net earnings from COPUSTAT database and mean earnings forecasts of financial analysts from I/B/E/S firm-years we split firm-years into just meet, beat and miss categories based on their relative position to all three common earnings benchmarks using procedure described by *Equation 1*. In total we observe 25986 firm-years just meeting analysts' forecasts, 6026 firm-years beating analysts' forecasts, 8040 firm-years just meeting zero earnings, 142060 firm-years beating zero earnings, 22833 firm-years just meeting last year's earnings and 110569 firm-years beating last year's earnings. Clearly, there are less observations in case of analysts' forecasts due to lower data availability (not all publicly listed companies are followed by financial analysts) and only a small fraction of observations is just meeting zero earnings benchmarks.

The original dataset contains outliers in nearly all variables. In general, such observations have potential to significantly distort the estimates and inferences of regression coefficients. There are two commonly used methods to mitigate this problem. One of them is trimming which means that outliers are excluded from the testing dataset as if they never existed. We implement the alternative approach – winsorization at top and bottom 1%. This method reduces the impact of outliers on regression results by limiting their value to the boundaries set by 1st and 99th percentiles of the original variable. Winsorization is believed to be less restrictive than trimming since it allows the existence of very large and small values while also mitigating their importance for regression. We perform one more transformation of our dataset intended to increase the reliability and relevance of the regression results that

has been advocated by several researchers (see i.e. Gunny, 2010 or Al-Shattarat et al., 2018) – exclusion of firms from regulated industries (SIC codes between 4400 and 5000) and financial institutions (SIC codes between 6000 and 6500) whose accounting rules are special and could distort the overall results.

After the data cleaning procedures described above, we are ready to analyse potential distortion of fitted coefficients due to the multicollinearity issue. To do so, we construct correlation matrixes of continuous variables used in our models described in previous sub-sections of *Research Design*. These matrixes are presented in *Table 1* and *Table 2*. Although some of the explanatory variables exhibit significant correlations with each other, we must remember that our primary aim is not to estimate ceteris paribus effects of individual variables on accounts receivables and future cash flows, but to measure the mean residual of firm-years that just met earnings benchmarks. Thus, we conclude that multicollinearity will not distort our findings about revenue management to meet earnings benchmark or about subsequent operating performace since residuals from regressions will not be distorted by possible multicollinearity of explanatory variables.

Table 1– Correlation matrix of discretionary revenue model data[4]

	CHANGE AR	CHANGE R	SIZE	AGE	ADJ GRRP	ADJ GRRN	ADJ GPM
CHANGE AR	1.00						
CHANGE R	0.62	1.00					
SIZE	0.29	0.38	1.00				
AGE	0.09	0.13	0.37	1.00			
ADJ GRRP	0.00	0.00	-0.01	-0.02	1.00		
ADJ GRRN	0.12	0.17	0.22	-0.01	0.01	1.00	
ADJ GPM	0.02	0.03	0.13	0.06	0.00	0.27	1.00

Table 2 – Correlation matrix of future performance model data[5]

	ADJ CFO	ADJ ROA	SIZE	MTB	ZSCORE
ADJ CFO	1.00				
ADJ ROA	0.09	1.00			
SIZE	0.31	0.36	1.00		
MTB	0.03	-0.09	-0.08	1.00	
ZSCORE	0.00	0.10	0.03	-0.03	1.00

[4] Presented matrix is composed of Pearson correlation coefficients. Industry-variant variables (*ADJ*) are standardized by industry-median adjustment, 1% of top and 1% of bottom values are winsorized. *CHANGE AR* is change in account receivables (explained variable in the model), *CHANGE R* is change in revenues, *SIZE* is the natural log of total assets, *AGE* is the natural log of the number of years since the first occurrence in database plus one year, *GRRP(N)* is the positive *(negative)* industry-median-adjusted growth rate in revenues, GRM is the industry-median-adjusted gross profit

[5] Presented matrix is composed of Pearson correlation coefficients. Industry-variant variables (ADJ) are standardized by industry-median adjustment, 1% of top and 1% of bottom values are winsorized. *CFO* denotes industry-median adjusted cash flow from operations (explained variable in the model), *ROA* denotes industry-median adjusted return on total assets, *SIZE* denotes natural logarithm of total assets, *MTB* denotes market-to-book ratio, *ZSCORE* denotes Mackie-Mason (1990) modified version of Altman's z-score described by *Equation 4*

The above described dataset is divided into six standalone testing datasets that are used to estimate conditional revenue model of earnings management and evaluation of subsequent operating performance. The datasets are divided based on earnings benchmark relevant for the specific test and by the variables that are needed to evaluate one of the models. All observations that do not have full rank of explained and explanatory variables (i.e. value of at least one variable is missing in the data) are dropped from these datasets.

In case of conditional revenue model of earnings management described by *Equation 2,* dataset for analysts' forecasts benchmark composes of 62732 firm-years observations of 8023 distinct firms, dataset for zero earnings benchmark composes of 216629 firm-years observations of 18229 distinct firms and dataset for last year's earnings benchmark composes of 216645 firm-years observations of 18229 distinct firms. Main statistics of model variables are presented in *Table 3*. In case of future operating performance evaluation by difference in differences model described by *Equation 3,* dataset for analysts' forecasts benchmark composes of 54346 firm-years observations of 7282 distinct firms, dataset for zero earnings benchmark composes of 86248 firm-years observations of 9656 distinct firms and dataset for last year's earnings benchmark composes of 86247 firm-years observations of 9656 distinct firms. Main statistics of model variables are presented in *Table 4*.

Table 3 – Discretionary revenues datasets summary[6]

Benchmark	Variable	Min.	First Quar.	Med.	Avg.	Third Quar.	Max.
Analyst Forecast	*ADJ GPM*	-19.06	-0.09	0.02	-0.20	0.14	0.56
	ADJ GRRN	-1.01	-0.08	0.00	-0.07	0.00	0.00
	ADJ GRRP	0.00	0.00	0.01	0.22	0.16	6.51
	AGE	0.69	1.79	2.56	2.48	3.22	3.83
	BEAT	0.00	0.00	0.00	0.09	0.00	1.00
	CHANGE AR	-156.04	-1.11	1.99	15.00	12.38	387.00
	CHANGE REV	-638.00	-0.03	17.60	113.18	85.28	2269.29
	JUST MEET	0.00	0.00	0.00	0.41	1.00	1.00
	SIZE	-0.51	4.41	5.59	5.74	6.94	10.14
Zero Earnings	*ADJ GPM*	-19.06	-0.10	0.00	-0.25	0.11	0.56
	ADJ GRRN	-1.01	-0.11	0.00	-0.09	0.00	0.00
	ADJ GRRP	0.00	0.00	0.00	0.26	0.15	6.51
	AGE	0.69	1.61	2.30	2.24	2.89	3.83
	BEAT	0.00	0.00	1.00	0.64	1.00	1.00
	CHANGE AR	-156.04	-0.36	0.42	9.40	4.51	387.00
	CHANGE REV	-638.00	-0.31	4.18	69.28	31.66	2269.29
	JUST MEET	0.00	0.00	0.00	0.04	0.00	1.00
	SIZE	-2.15	2.78	4.25	4.39	5.91	10.14
Last Earnings	*ADJ GPM*	-19.06	-0.10	0.00	-0.25	0.11	0.56
	ADJ GRRN	-1.01	-0.11	0.00	-0.09	0.00	0.00
	ADJ GRRP	0.00	0.00	0.00	0.26	0.15	6.51
	AGE	0.69	1.61	2.30	2.24	2.89	3.83
	BEAT	0.00	0.00	0.00	0.48	1.00	1.00
	CHANGE AR	-156.04	-0.36	0.42	9.40	4.51	387.00
	CHANGE REV	-638.00	-0.31	4.18	69.29	31.67	2269.29
	JUST MEET	0.00	0.00	0.00	0.10	0.00	1.00
	SIZE	-2.15	2.78	4.25	4.39	5.91	10.14

[6] Industry-variant variables (*ADJ*) are standardized by industry-median adjustment, 1% of top and 1% of bottom values are winsorized. Statistics are based on 62732 observations (analysts' forecasts), 216629 observations (zero earnings) and 216645 observations (last year's earnings), respectively. *CHANGE AR* is change in account receivables, *CHANGE R* is change in revenues, *SIZE* is the natural log of total assets, *AGE* is the natural log of the number of years since the first occurrence in database plus one year, *GRRP(N)* is the positive (negative) industry-median-adjusted growth rate in revenues, *GRM* is the industry-median-adjusted gross profit margin.

Table 4 – Future performance datasests summary[7]

Benchmark	Variable	Min.	First Quar.	Med.	Avg.	Third Quar.	Max.
Analyst Forecast	*ADJ CFO*	-91.64	-2.84	12.55	174.96	91.25	3571.62
	ADJ ROA	-3.51	-0.02	0.03	0.02	0.10	0.46
	JUST MEET	0.00	0.00	0.00	0.41	1.00	1.00
	MTB	-10.75	1.26	2.08	3.05	3.56	30.02
	SIZE	-0.51	4.41	5.58	5.73	6.92	10.14
	ZSCORE	-139.34	0.92	2.04	1.50	3.02	8.64
Zero Earnings	*ADJ CFO*	-91.64	-4.55	3.01	127.29	47.55	3571.62
	ADJ ROA	-3.51	-0.05	0.02	-0.01	0.09	0.46
	JUST MEET	0.00	0.00	0.00	0.04	0.00	1.00
	MTB	-10.75	1.10	1.92	2.95	3.43	30.02
	SIZE	-2.15	3.58	4.92	5.06	6.44	10.14
	ZSCORE	-139.34	0.63	1.90	1.15	2.95	8.64
Last Earnings	*ADJ CFO*	-91.64	-4.55	3.01	127.29	47.55	3571.62
	ADJ ROA	-3.51	-0.05	0.02	-0.01	0.09	0.46
	JUST MEET	0.00	0.00	0.00	0.09	0.00	1.00
	MTB	-10.75	1.10	1.92	2.95	3.43	30.02
	SIZE	-2.15	3.58	4.92	5.06	6.44	10.14
	ZSCORE	-139.34	0.63	1.90	1.15	2.95	8.64

[7] Industry-variant variables (ADJ) are standardized by industry-median adjustment, 1% of top and 1% of bottom values are winsorized. Statistics are based on 54346 observations (analysts' forecasts), 86248 observations (zero earnings) and 86247 observations (last year's earnings), respectively. *CFO* denotes industry-median adjusted cash flow from operations, *ROA* denotes industry-median adjusted return on total assets, *SIZE* denotes natural logarithm of total assets, *MTB* denotes market-to-book ratio, *ZSCORE* denotes Mackie-Mason (1990) modified version of Altman's z-score described by *Equation 4*

4 Empirical results

Following previous research papers (Burgstahler et al., 2006; Brown and Caylor, 2005; Plummer and Mest, 2001; Degeorge et al., 1999 or Brown, 1997) we firstly visually examine distribution of firm-years on the verge of earnings targets. To do so, we create histograms showing the frequency of firm-years in the interval from -0.05 to 0.05 deviations from earnings targets as a percentage of total assets divided into ten bins by 0.01 steps. Therefore, the bin right above zero corresponds to our category "just met". Similarly, the bin just below 0 can be referred to as "just missed". We compose these histograms for all three examined benchmarks separately and present them as *Figure 1*, *Figure 2* and *Figure 3,* respectively.

Figure 1 – Distribution around mean analysts' Earnings forecast Benchmark

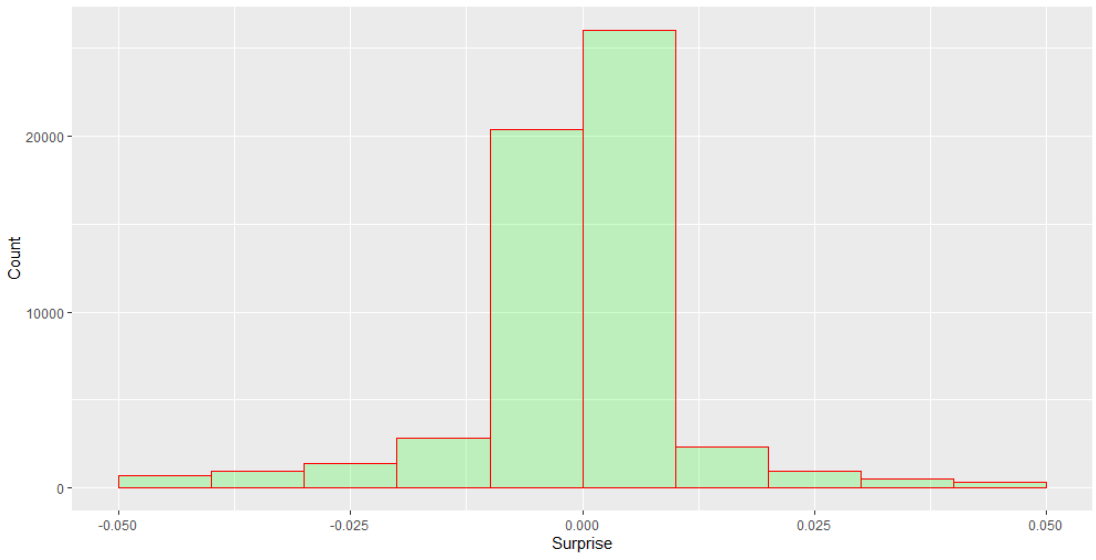


Figure 2 – Distribution around zero Earnings Benchmark

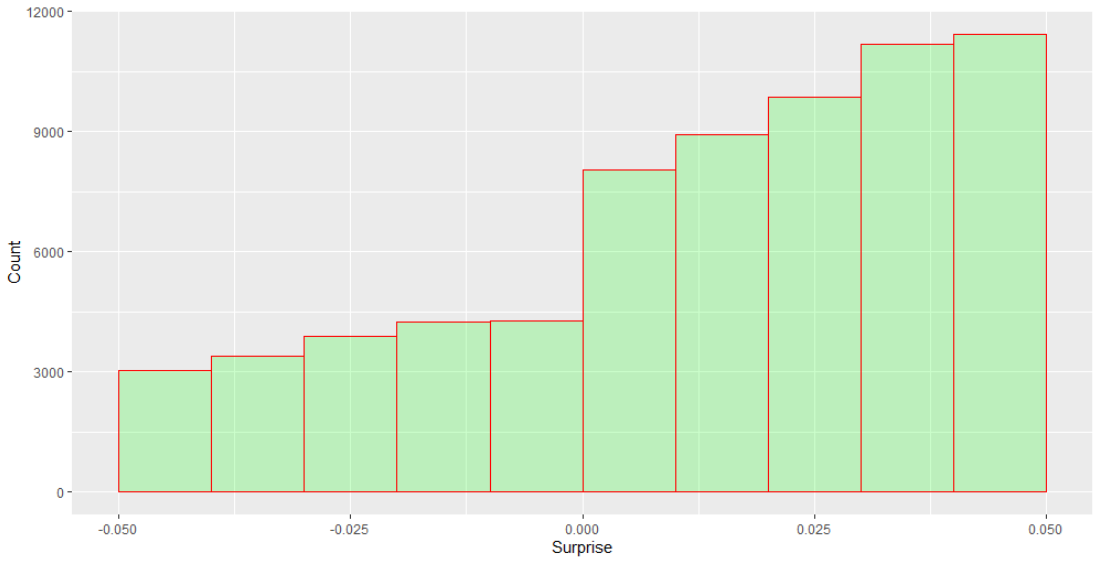
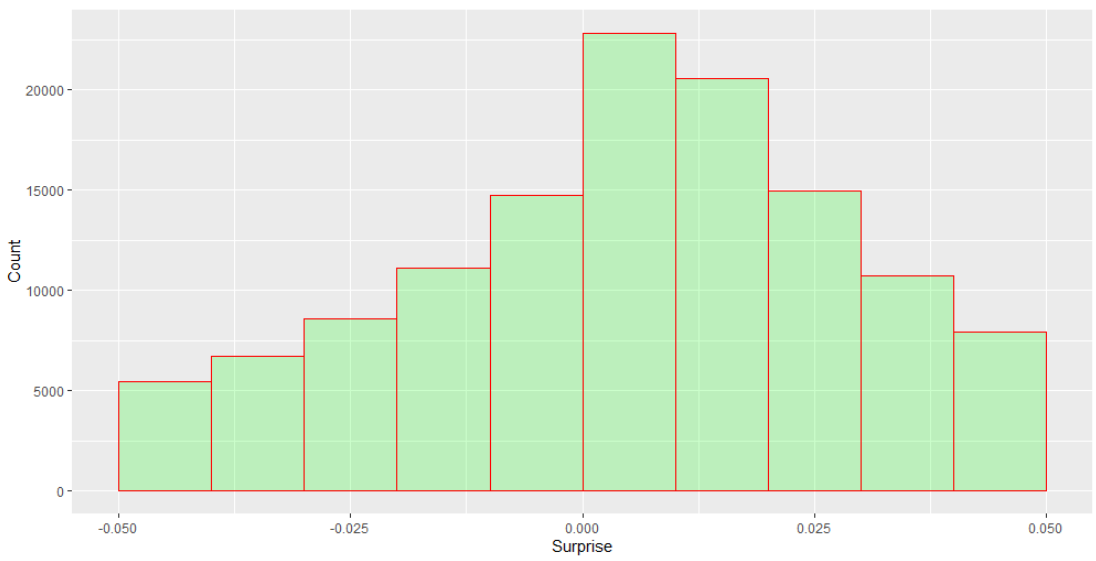


Figure 3 – Distribution around last year's Earnings Benchmark



Similiarly to the past literature (Burgstahler et al., 2006; Brown and Caylor, 2005; Plummer and Mest, 2001; Degeorge et al., 1999 or Brown, 1997) we observe discontinuity around zero. Firm-years just meeting earnings benchmarks are much more frequent compared to just missing firm-years in case of all common earnings benchmarks (around 20000 firm-years just missed analysts' forecasts while more than 25000 just met them, in case of zero earnings this ratio 4000 to 8000 and in case of last

year earnings 15000 to 25000). Hence, we can conclude that our sample suggests that the probability of firms just meeting earnings targets is higher than just missing them. What we can also see from the histograms is that the dispersion around consensus of analysts' forecast is relatively low, thus, analysts seem to be effective at estimating earnings of publicaly listed companies and we can also notice that the distribution around zero earnings target is most significantly skewed towards negative values.

Before we proceed with statistical tests whether firms in our sample indeed exhibit signs of revenue management to meet earnings benchmarks and their subsequent performence we need to select appropriate panel data model that should be used to estimate conditional revenue model described by *Equation 2* and future performance model described by *Equation 3*. The results of these selection and robustness tests are summarized in *Table 5*. As a first step, we need to ensure that our panel data are stacionary in the time dimension. We test the null hypothesis of unit-root present in the data using Maddala-Wu Unit-Root Test. It is one of numerous Fisher-type tests that combine p-values from augmented Dickey-Fuller regressions for each time series proposed as a proper stationarity test for panel data models (Maddala and Wu, 1999). We can reject the zero hypothesis against the alternative of stationarity with high level of confidence in case of all fitted models. Thus, we conclude that our data are stationary, and the assumption of panel data models is met, so we can use them to consistently estimate the associacions.

After that, we estimate pooled model and fixed individual, time and two-ways effects models to select appropriate version of panel data models. We use simple F-test to evaluate whether either time or individual fixed effects are significant. We see that in case of analysts' forecast benchmark, there is a very strong evidence that individual

effects are not present in the data. In case of last year's and zero earnings benchmarks the F-test results indicate the presence of individual effects in the data. Time effects are identified by F-tests in all models. Thus, pooled model is always inconsistent, and we must estimate the association between just meeting earnings benchmarks and abnormal revenues by fixed or random effects model – two-ways in case of zero and last year's earnings as there is an evidence of both time and individual effects and time effects in case of analysts' forecast benchmark.

In the next step, we fit random effects model and test its consistency against fixed time effects model from the previous step using Hausman test for panel models. In case of analysts' forecasts, Hausman test fails to reject the zero hypothesis of both models being consistent. Hence, for the hypothesis testing we use random time effects model as it is more efficient compared to fixed time effects models. For zero and last earnings, Hausman test rejects the zero hypothesis against the alternative that random effects model is inconsistent. Therefore, fixed two-ways effects models are used to estimate abnormal revenues.

Lastly, panel data models usually suffer from heteroscedasticity and serial correlation in the idiosyncratic errors. In order to test for its presence in our models we use panel data version of Breusch-Godfrey test for serial correlation on the fitted models. According to our expectations this test detects significant presence of serial correlation in our models. To fix this issue we test the inference of our results using clustered White standard errors computed according to procedure proposed by Arellano (1987) that should make our inference robust to both heteroscedasticity and serial correlation.

Table 5 – Model selection and robustness tests summary

Benchmark	Model	Robustness test	p-value	Alternative
Analyst Forecast	Earnings management	Maddala-Wu Unit-Root Test	0.00	Stationarity
		F test for individual effects	1.00	Significant effects
		F test for time effects	0.00	Significant effects
		F test for twoways effects	0.06	Significant effects
		Hausman Test	0.07	Inconsistent random effects
		Breusch-Godfrey/Wooldridge Test	0.00	Serial correlation
Analyst Forecast	Future performance	Maddala-Wu Unit-Root Test	0.00	Stationarity
		F test for individual effects	0.00	Significant effects
		F test for time effects	0.00	Significant effects
		F test for twoways effects	0.00	Significant effects
		Hausman Test	0.00	Inconsistent random effects
		Breusch-Godfrey/Wooldridge Test	0.00	Serial correlation
Zero Earnings	Earnings management	Maddala-Wu Unit-Root Test	0.00	Stationarity
		F test for individual effects	0.02	Significant effects
		F test for time effects	0.00	Significant effects
		F test for twoways effects	0.00	Significant effects
		Hausman Test	0.00	Inconsistent random effects
		Breusch-Godfrey/Wooldridge Test	0.00	Serial correlation
Zero Earnings	Future performance	Maddala-Wu Unit-Root Test	0.00	Stationarity
		F test for individual effects	0.00	Significant effects
		F test for time effects	0.00	Significant effects
		F test for twoways effects	0.00	Significant effects
		Hausman Test	0.00	Inconsistent random effects
		Breusch-Godfrey/Wooldridge Test	0.00	Serial correlation
Last Earnings	Earnings management	Maddala-Wu Unit-Root Test	0.00	Stationarity
		F test for individual effects	0.00	Significant effects
		F test for time effects	0.00	Significant effects
		F test for twoways effects	0.00	Significant effects
		Hausman Test	0.00	Inconsistent random effects
		Breusch-Godfrey/Wooldridge Test	0.00	Serial correlation
Last Earnings	Future performance	Maddala-Wu Unit-Root Test	0.00	Stationarity
		F test for individual effects	0.00	Significant effects
		F test for time effects	0.00	Significant effects
		F test for twoways effects	0.00	Significant effects
		Hausman Test	0.00	Inconsistent random effects
		Breusch-Godfrey/Wooldridge Test	0.00	Serial correlation

Using the same procedure described in previous paragraphs we also select appropriate models for evaluation of future operating performance. According to the

results, we should evaluate the association of meeting earnings targets by upward oriented revenue management and future operating performance through fixed two-ways effects models and White-Arellano robust standard errors in case of all earnings targets.

After the selection of appropriate panel data testing framework, we fit the discretionary revenue model described by *Equation 2* and report the detailed results in *Table 6*. Under our first hypothesis, we should find statisticaly significant positive discretionary revenues for firms that just met earnings benchmarks which would be a sign of upward revenue management. After controlling for the effects of changes in revenues and the firm's credit policy, the results, similiarly to those observed by Stubben (2006) and Caylor (2010), indicate that firms on average exhibit positive discretionary revenues while just meeting analysts' forecasts. Furthermore, we find significantly negative effect of beating analyst's forecasts by a large margin. These two findings together present very strong evidence of upward revenue management to meet earnings targets and downward oriented revenue management while beating earnings targets to build up reserves for upcoming periods, thus, smooth the income in time. That indicates highly rational behavior of managers who are motivated to consistently meet expectations rather than beat them in current period by a large margin and miss it in subsequent periods.

Unlike Stubben (2006) and Caylor (2010) we also find evidence of revenue management to beat last year's earnings as we observe significantly positive discretionary revenues while just meeting earnings targets. In this case we observe significantly positive abnormal revenues even for firm-years beating the earnings targets which indicates that firms do not smooth income to steady the growth rate over

time but exhibit pro-cyclical behavior. But, the strength of the effect of just meeting the target is larger than the effect of beating it, resulting in our interpretation that the upward-oriented revenue management is used while just meeting last year's earnings benchmark to larger extent compared to beating it. However, we fail to find statistical evidence of upward-oriented revenue management to meet zero earnings benchmark. Hence, we find evidence in favor of *Hypothesis 1* for analysts' forecasts and last year's earnings benchmarks but firms just meeting zero earnings seem to prefer alternative channels of earnings management.

Using fixed two-ways effects models selected as appropriate panel data model for fitting the future performance model, we also evaluate the association of meeting earnings targets by upward-oriented revenue management and the future operating performance. The detailed regression results are presented in *Table 7*. Our main goal is to find evidence that firms that exhibited signs of revenue management to just meet earnings targets on average outperform firms that just met earnings targets without inflating revenues. Such evidence would be in line with our main testing hypothesis that revenue management to meet earnings target is informative about the future performance outlook of the firm. Furthermore, our *Hypothesis 3* implies that the informative power of revenue management to meet earnings benchmark about strong future performance is higher for firms with higher growth opportunities. We test this prediction by adding proxy of growth opportunities perceived by markets (*MTB*) to the interaction term.

Table 6 – Conditional revenues model results[8]

	(1) Analysts' forecasts		(2) Zero earnings		(3) Last year's earnings	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
CHANGE R	0.03 (0.02)	0.05	0.06 (0.01)	0.00	0.07 (0.01)	0.00
JUST MEET	**4.32** **(0.56)**	**0.00**	**0.28** **(0.60)**	**0.64**	**2.00** **(0.45)**	**0.00**
BEAT	-1.29 (0.61)	0.03	3.67 (0.26)	0.00	1.61 (0.23)	0.00
*CHANGE R*SIZE*	0.01 (0.00)	0.00	0.00 (0.00)	0.01	0.00 (0.00)	0.01
*CHANGE R*AGE*	-0.37 (0.79)	0.64	-0.34 (0.97)	0.73	-0.31 (0.97)	0.75
*CHANGE R*AGE_SQ*	0.22 (0.65)	0.74	0.21 (0.69)	0.76	0.22 (0.69)	0.75
*CHANGE R*GRRP*	0.00 (0.00)	0.00	0.00 (0.00)	0.37	0.00 (0.00)	0.39
*CHANGE R*GRRN*	-0.07 (0.02)	0.00	-0.05 (0.01)	0.00	-0.05 (0.01)	0.00
*CHANGE R*GPM*	2.25 (1.45)	0.12	2.69 (4.36)	0.54	2.85 (4.36)	0.51
*CHANGE R*GPM_SQ*	4.51 (1.21)	0.00	6.86 (1.97)	0.00	6.86 (1.97)	0.00
Model	Random time effects		Fixed two-ways effects		Fixed two-ways effects	
SE type	Clustered White-Arellano		Clustered White-Arellano		Clustered White-Arellano	
R-SQ	0.37		0.26		0.26	
Adj. R-SQ	0.37		0.20		0.20	
Observations	62732		216629		216645	

[8] Estimates of conditional revenue models

(1) $$\boldsymbol{CHANGE\_AR_{i,t}} = \alpha + \beta_1 * CHANGE\_R_{i,t} + CHANGE\_R_{i,t} * (\beta_2 * SIZE_{i,t} + \beta_3 * AGE_{i,t} + \beta_4 * AGE\_SQ_{i,t} + \beta_5 * GRR\_P_{i,t} + \beta_6 * GRR\_N_{i,t} + \beta_7 * GRM_{i,t} + \beta_8 * GRM\_SQ_{i,t}) + \boldsymbol{\beta_9 * JUST\_MEET\_ANALYST_{i,t}} + \beta_{10} * BEAT\_ANALYST_{i,t} + \varepsilon_{i,t}$$

(2) $$\boldsymbol{CHANGE\_AR_{i,t}} = \alpha + \beta_1 * CHANGE\_R_{i,t} + CHANGE\_R_{i,t} * (\beta_2 * SIZE_{i,t} + \beta_3 * AGE_{i,t} + \beta_4 * AGE\_SQ_{i,t} + \beta_5 * GRR\_P_{i,t} + \beta_6 * GRR\_N_{i,t} + \beta_7 * GRM_{i,t} + \beta_8 * GRM\_SQ_{i,t}) + \boldsymbol{\beta_9 * JUST\_MEET\_ZERO_{i,t}} + \beta_{10} * BEAT\_ZERO_{i,t} + \varepsilon_{i,t}$$

(3) $$\boldsymbol{CHANGE\_AR_{i,t}} = \alpha + \beta_1 * CHANGE\_R_{i,t} + CHANGE\_R_{i,t} * (\beta_2 * SIZE_{i,t} + \beta_3 * AGE_{i,t} + \beta_4 * AGE\_SQ_{i,t} + \beta_5 * GRR\_P_{i,t} + \beta_6 * GRR\_N_{i,t} + \beta_7 * GRM_{i,t} + \beta_8 * GRM\_SQ_{i,t}) + \boldsymbol{\beta_9 * JUST\_MEET\_LAST_{i,t}} + \beta_{10} * BEAT\_ANALYST_{i,t} + \varepsilon_{i,t}$$

coefficients are provided in individual columns, model specification, standard errors type (shown in parentheses bellow coefficient), R-Squared, adjusted R-Squared and number of observations provided for each model separately. Industry-variant variables are standardized by industry-median adjustment, 1% of top and 1% of bottom values are winsorized. *VARIABLE*VARIABLE* indicates interaction term. ***CHANGE AR* is change in account receivables**, *CHANGE R* is change in revenues, *SIZE* is the natural log of total assets, *AGE* is the natural log of the number of years since the first occurrence in database plus one year, *GRRP(N)* is the positive (negative) industry-median-adjusted growth rate in revenues, *GRM* is the industry-median-adjusted gross profit margin. ***JUST MEET* measures the mean abnormal revenues of firm-years just meeting earnings targets.**

After controlling for the base operating performance, size effect, financial health and growth opportunities, we find significantly positive effect of using revenue management to just meet analysts' earnings forecasts on stronger subsequent operating performance relative to just meeting them without the use of discretionary revenues. That is in line with our expectation, that revenue management to meet analysts' earnings forecasts is informative about the future operating performance. Furthermore, we observe also significantly positive effect of meeting analysts' earnings forecasts by revenue management and having large growth opportunities on subsequent improvements of operating performance relative to those with lower growth opportunities perceived by financial markets. That is an evidence in favor of our hypothesis that there is positive association of growth opportunities and informative power of revenue management about future operating performance.

The point estimates of both above discussed effects are positive for last year's earnings target as well, however, their inference reveals that their statistical significance is very low. What's more, we find statistically significant evidence, that the association of future operating performance and meeting zero earnings by managing revenues upwards is in fact negative. But, we must remember that we found little evidence that firms are using revenue management to reach zero earnings at all. Hence, we conclude that we fail to find an evidence in favor of our hypotheses about the associations with the future operating performance in case of both zero and last year's earnings targets. However, we also do not observe detrimental effects of revenue management on the subsequent performace in case of last year's earnings benchmark which indicates that the purpose of the artificial adjustments to just meet the benchmark is not to mislead investors.

Table 7 – Future performance model results[9]

	(1) Analysts' forecasts		(2) Zero earnings		(3) Last year's earnings	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
ADJ ROA	136.45 (77.21)	0.08	54.99 (39.43)	0.16	52.84 (38.95)	0.17
SIZE	63.80 (25.66)	0.01	40.19 (20.78)	0.05	40.19 (20.65)	0.05
MTB	-0.41 (1.29)	0.75	0.72 (0.78)	0.36	0.63 (0.78)	0.42
ZSCORE	-0.59 (0.96)	0.54	0.11 (0.09)	0.21	0.11 (0.09)	0.21
JUST MEET	26.40 (9.01)	0.00	-8.49 (6.66)	0.20	-13.02 (13.32)	0.33
EM	-0.65 (16.68)	0.97	60.44 (19.26)	0.00	55.91 (16.76)	0.00
JUST MEET*EM	**92.21** **(28.48)**	**0.00**	**-78.01** **(33.35)**	**0.02**	**12.69** **(46.74)**	**0.79**
*MTB*JUST MEET*	0.58 (1.33)	0.67	-0.53 (1.5)	0.72	1.44 (1.87)	0.44
*MTB*EM*	-9.70 (4.17)	0.02	2.28 (2.28)	0.32	1.50 (2.21)	0.50
MTB*JUST MEET*EM	**10.45** **(4.02)**	**0.01**	**5.27** **(5.16)**	**0.31**	**12.99** **(8.23)**	**0.11**
Model	Fixed two-ways effects		Fixed two-ways effects		Fixed two-ways effects	
SE type	Clustered White-Arellano		Clustered White-Arellano		Clustered White-Arellano	
R-SQ	0.01		0.00		0.00	
Adj. R-SQ	-0.15		-0.12		-0.12	
Observations	54346		86248		86247	

[9]Estimates of future performance models

(1) $$\boldsymbol{ADJ\_CFO_{i,t+1}} = \alpha + \beta_1 * ADJ\_ROA_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * MTB_{i,t} + \beta_4 * ZSCORE_{i,t} + \beta_5 * JUST\_MEET_{i,t} + \beta_6 * EM_{i,t} + \beta_7 * \boldsymbol{JUST\_MEET\_ANALYST_{i,t} * EM_t} + \beta_8 * MTB_{i,t} * JUST\_MEET\_ANALYST_{i,t} + \beta_9 * MTB_{i,t} * EM_{i,t} + \beta_{10} * \boldsymbol{JUST\_MEET\_ANALYST_{i,t} * EM_t * MTB_{i,t}} + \varepsilon_{i,t}$$

(2) $$\boldsymbol{ADJ\_CFO_{i,t+1}} = \alpha + \beta_1 * ADJ\_ROA_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * MTB_{i,t} + \beta_4 * ZSCORE_{i,t} + \beta_5 * JUST\_MEET_{i,t} + \beta_6 * EM_{i,t} + \beta_7 * \boldsymbol{JUST\_MEET\_ZERO_{i,t} * EM_t} + \beta_8 * MTB_{i,t} * JUST\_MEET\_ZERO_{i,t} + \beta_9 * MTB_{i,t} * EM_{i,t} + \beta_{10} * \boldsymbol{JUST\_MEET\_ZERO_{i,t} * EM_t * MTB_{i,t}} + \varepsilon_{i,t}$$

(3) $$\boldsymbol{ADJ\_CFO_{i,t+1}} = \alpha + \beta_1 * ADJ\_ROA_{i,t} + \beta_2 * SIZE_{i,t} + \beta_3 * MTB_{i,t} + \beta_4 * ZSCORE_{i,t} + \beta_5 * JUST\_MEET_{i,t} + \beta_6 * EM_{i,t} + \beta_7 * \boldsymbol{JUST\_MEET\_LAST_{i,t} * EM_t} + \beta_8 * MTB_{i,t} * JUST\_MEET\_LAST_{i,t} + \beta_9 * MTB_{i,t} * EM_{i,t} + \beta_{10} * \boldsymbol{JUST\_MEET\_LAST_{i,t} * EM_t * MTB_{i,t}} + \varepsilon_{i,t}$$

coefficients are provided in individual columns, model specification, standard errors type (shown in parentheses bellow coefficient), R-Squared, adjusted R-Squared and number of observations provided for each model separately. Industry-variant variables are standardized by industry-median adjustment, 1% of top and 1% of bottom values are winsorized. *VARIABLE***VARIABLE* indicates interaction term. ***CFO* denotes industry-median adjusted cash flow from operations**, *ROA* denotes industry-median adjusted return on total assets, *SIZE* denotes natural logarithm of total assets, *MTB* denotes market-to-book ratio, *ZSCORE* denotes Mackie-Mason (1990) modified version of Altman's z-score described by *Equation 4.* EM is a dummy variable equal to 1 if the firm-year is in the highest quintile (i.e. top 20%) of residuals from regression described by *Equation 2*. **Interaction of *JUST MEET* and *EM* measures the effect of meeting earnings targets by revenue management on subsequent *CFO*. Interaction of *JUST MEET*, *EM* and *MTB* measure the effect of meeting earnings targets by revenue management on subsequent *CFO* considering growth opportunities.**

5 Conclusion

Our main research goal is to provide evidence of rational selection of specific channels of earnings management implemented by managers. To do so, we choose to examine subsequent performance of firms that just met earnings benchmarks using revenue management. We argue that revenue management is more costly but more efficient in inducing higher market expectations compared to expense management. Thus, rational managers should choose to manage earnings upwards via revenues only if they intend to reveal their private information about strong future performance to investors. To test our prediction that revenue management to meet earnings benchmarks is informative about future performance, we use modern discretionary revenues methodology that is arguably more powerful in detecting earnings management than traditional models.

Our results are in line with the findings of past papers as we re-created "kink distribution" of firm-years around the target values of all common earnings benchmarks observed in the past literature (Burgstahler et al., 2006; Brown and Caylor, 2005; Plummer and Mest, 2001; Degeorge et al., 1999 or Brown, 1997). Also, we extend the evidence presented by Stubben (2006) and Caylor (2010) who argue that firms are on average using upward-oriented revenue management to meet consensus of analysts' earnings forecasts by finding that they seem to be using upward-oriented earnings management also in case of just meeting last year's earnings benchmark. Furthermore, unlike Stubben (2006) and Caylor (2010), we present evidence of firms on average using downward-oriented revenue management when they are beating consensus of analysts' earnings forecasts by a large margin, thus, smoothing the

income in time. However, we fail to find evidence of revenue management to meet zero earnings benchmark. Combined with the observed discontinuity around the target value, this could indicate that firms on the verge of loss do not manage earnings via revenues and prefer to use alternative channels of earnings management. But, the driver of this result may also be the composition of the data as vast majority of firm-years in our sample beats the zero earnings targets by a large margin and just a little fraction just meets it.

We obtain evidence that revenue management is informative about strong subsequent performance in case it is done to just meet the consensus of analysts' earnings forecasts. Since contemporary literature presents evidence that the pressures on meeting consensus of analysts' forecasts grew as a direct consequence of greater analysts' coverage (Huang et al., 2017; Sun and Liu 2016 or He and Tian, 2013) we suggest that the informative power of managing earnings through revenues will be highest in case of this earnings benchmark, which is believed to be the most important for the formation of the market perception of the firm. Hence, we conclude that we present evidence that managers exhibit cost-minimizing behavior and choose revenue management to meet consensus of analysts' earnings forecasts in order to benefit from its larger signaling power of strong future performance (Ghosh, Gu, and Jain 2005) to efficiently communicate their private information about the future operating performance to the markets rather than trying to benefit from the information asymmetry according to principal-agent theory. Further, we present evidence that the association is stronger for firms with higher growth opportunities perceived by markets, thus, our results indicate that revenue management to meet consensus of analysts's forcasts is indeed effiecient way to communicate future growth opportunities. We fail to find evidence in favor of our theory in case of zero and last

year's earnings targets. However, the evidence is not in favor of the opportunistic use of revenue management to meet these targets either.

Our results are relevant for investors, auditors, regulators, financial analysts and other researchers since we argue that inflated revenues used to just meet consensus of analyst's forecasts should not be interpreted as an attempt to mislead them about the operating performance. Rather, it should be perceived as an attempt to communicate good prospects of the company in the upcoming periods. Future research building on our findings could focus on re-estimating our models using different datasets, implementing different methodologies of estimation or examining the associacion of expense management used to meet earnings benchmarks and the future operating performance.

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