ERASMUS UNIVERSITY ROTTERDAM

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Master Thesis [programme Accounting and Audit]

The Effect of S&P 500 Index Addition on Earnings Management

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1. Abstract

This research examines the relation between S&P 500 Index addition and earnings management level of the firms that are added to the index. Using the data from WRDS: Index Constituents and Compustat this study calculates the number of index additions from 2000 to 2017. This study adopts Dichev's accrual duration model instead of modified Jones model, due to the extensive list of faults of the last one. The results of this study suggest that firms added to the index tend to engage more in the earnings management than their potential matches. However, this study did not find enough evidence to explain the relation between index addition and earnings per share, which is used as a proxy for firms' performance.

2. Introduction

Standard & Poor's (S&P) 500 Index is an American stock market index, which includes 500 US stock companies with the largest capitalization. There are several criteria for being add to this index: company should be profitable and a leader in an important U.S. industry; a company should have sufficient level of liquidity and a relatively diverse ownership structure. List of S&P 500 companies is often revised, which leads to the deletion/inclusion of some companies from/to the Index. Addition to the list have significant effect on a newly added company - an increase in stock price.

Inclusion in S&P 500 was thought to be an information-free event, i.e. S&P has not claimed that inclusion acts for an endorsement of the recently added stock's future prospects (Standard & Poor's 2002). Therefore, addition to the index does not provide new information about company's future returns and change in stock price of the newly included firm is due to the other factors. However, empirical studies prove the opposite: Dhillon and Johnson (1991) found that inclusion in S&P 500 provides new information about option's future returns which leads to change in option price; Jain (1987) states that S&P has a good reputation in terms of monitoring the companies listed in their indices, so addition of a company to the index will provide investors with a signal of significant future returns at a low risk; Denis, McConnell, Ovchinnikov and Yu (2003) refer to the investors' scrutiny which affects the managers of a company that was newly added to the Index and leads to improvements of a financial performance of the company. Thus, empirical studies provide a following chain reaction of the S&P 500 membership:

Addition to S&P 500 ⇒ New information about stock's future prospects ⇒ Investors' reaction (represented by an increase in investors' earnings expectations) ⇒ Improvement of financial performance of the company (increase in stock price and positive abnormal returns)

This chain reaction is intriguing because of the arising capital market incentives for earnings management: inclusion to the S&P 500 leads to an increase in investors' earnings expectations. Notwithstanding the fact that it could result in a greater monitoring of the newly added company by investors, it could potentially give incentives to the managers of the company for earnings management to meet or beat investors' earnings expectations.

This research examines the correlation between S&P 500 membership and earnings management in the newly added companies. Thus, it aims to answer following research question:

"*Are companies that have been recently added to S&P 500 Index more amenable to earnings management?"*

The sample of S&P 500 additions is used to distinguish how addition event affects earnings of the added company. Data for changes in S&P 500 Index and financial data are extracted from Compustat database. Dichev's accrual duration model is used in order to calculate the level of discretionary accruals of a firm. Discretionary accruals are used as a proxy for earnings management. Further, research examines a difference in the level of discretionary accruals between the companies that were added to the Index and that were not.

The main results of this study evidence that there is a significantly negative difference in level of discretionary accruals: firms that were added to the Index report higher discretionary accruals, than their potential matches. Test of standard deviations of the residuals supports this argument. Therefore, this study concludes that recently added companies are more amenable to earnings management.

This study contributes to the present literature concerning the effect of Index inclusion on financial performance of the firm. Findings of this research may support Standard & Poor's in its argument of S&P 500 addition being an information-free event or these findings may support present literature stating the opposite to the S&P. Due to the high correlation between audit quality and earnings management, this research can also be useful from audit perspectives. This study evidence that managers of the newly added firms tend to engage into earnings management, which supports the argument, that S&P addition is not an information-free event. Accrual duration model have showed that in the period of a year after addition to the Index correlated cash flows no longer describe correlated accruals. This result hints at existence of the new factor that affect accruals after addition to the S&P 500. Lastly, this thesis could provide specific value to Dichev and Owens, since this study uses their model as a main regression of the thesis.

This research could be valuable for practitioners, since its literature review describes stock price shock from the point of different hypothesis, and also results of this thesis suggest that recently added companies report lower earnings quality, than their matches. Therefore, stakeholders and investors should be aware about this factor.

3. Literature review

The extensive list of literature about the effect of changes in S&P 500 focuses on two major points: the index effect of inclusion to the S&P 500 and changes in financial reports after the company is added to S&P 500. Standard & Poor's rejects the arguments that selection process for the S&P 500 Index is based on the future prospects of the companies (Standard & Poor's 2002). However, the act of

addition to the index results in significant abnormal returns of the newly added company. Some researches stated that inclusion to S&P 500 reveals new information about the expected distribution of a security's future returns (Dhillon and Johnson 1991). Furthermore, S&P 500 Index is famous for high monitoring standards and preferences for stable companies, so index's reputation could provide signals for investors that newly added companies will provide better future returns than non-index companies (Jain 1987). Contrary to other studies, Lynch and Mendenhall (1997) provided evidence that addition to S&P is an information-free event, because stock price changes following the inclusion of the company to the index is not permanent.

Baran et al. (2018) examine the credit default swap (CDS) spreads after addition to the index and after deletion from the index. Authors found out that there is a significant negative effect on CDS spreads after addition announcement in the period of 2001-2004. Furthermore, the index inclusion results in positive and significant stock market reaction. In addition, authors have described five relevant hypotheses about the information content of S&P 500 Index:

- Downward-sloping demand curve hypothesis: Scholes (1972) stated that S&P 500 index revisions convey no information, while the price effect is a result of imperfect substitute of index stocks with non-index stocks. Shleifer (1986) have shown the limit of arbitrageurs' ability to delete any mispricing of stocks without close substitutes. Wurgler and Zhuravskaya (2002) support this evidence by showing that demand curve's slope for index stocks significantly fluctuates with the level of arbitrage risk;
- Price pressure hypothesis: Harris and Gurel (1986) described that price changes result from temporary price pressure from index fund rebalancing. Furthermore, addition to the S&P 500 index is an information-free event, because research's sample has showed that stock prices reverse back over the 30 days;
- Certification hypothesis: Jain (1987) showed the evidences that index inclusion provides signals to investors, which might affect their perception of the stocks. Dhillon and Johnson (1991) revealed that changes in stock, bond and option prices around the S&P 500 Index addition announcement in the period from 1978-1988 was due to the effect of information content of this announcement on equity, debt and option markets. Denis et al. (2003) and Platikanova (2008) support the argument that S&P 500 addition conveys some information that might affect investors decisions, because there are earnings improvement around the announcement day. Furthermore, Cai (2007) suggest that positive addition information also affects the industry of the added company. Kappou et al. (2008) supports the argument that index reputation affects firm performance: there is a significant increase in EPS after addition to the index, also S&P 500 certification might aid to attract new capital and lead to an increase in expected future cash flow. On the

other hand, Shleifer (1986) argued that improved quality of firms is not related with inclusion to the index, as the abnormal returns are not correlated with bond ratings;

- Investor awareness hypothesis – main premise of this hypothesis is the effect of information asymmetry on investors: lack of information results in holding portfolios that are not fully diversified. Chen et al. (2004) have revealed that increased investor awareness after index inclusion results in decrease of the shadow cost, however, that cost does not decline when firm is removed from the index, since investor awareness is not affected by this event;
- Liquidity hypothesis: Amihud and Mendelson (1986) suggest that added companies attract more institutional holdings and larger trading volume, i.e. index addition results in greater institutional interest, a richer information environment, and higher liquidity with a higher trading volume. Consequently, there is less information asymmetry, which leads to increase in stocks' liquidity. Therefore, stock prices increase. Hedge and McDermott (2003) provided an evidence that permanent stock price increase is correlated with liquidity improvement after index addition.

Chan and Zhao (2018) state that addition of a stock to an Index results in increase of the demand for the stock. Furthermore, media coverage of the announcement reduces information asymmetry. Researchers argued that new information about future cash flows or required rates of returns for the added firms is required for permanent price effect. Authors focus on corporate bonds in their research, as the price effect, resulted from new information from index revisions, should also be observed in other securities issued by the firm. Their results have showed that the yields of corporate bonds of added firms experience no significant changes, therefore, index addition does not affect corporate bonds of the added company. Furthermore, there weren't found any significant changes in realized earnings for added firms. Thus, researchers conclude that addition to the index does not result in improved performance of the added firms. In addition, researchers claim that main difference between is whether price change is permanent after the index revision or not. Four out of five hypotheses state that price change is permanent except for price pressure hypothesis. Harris and Gurel (1986) argue that index-tracking funds are required to rebalance their portfolios, which will result in decrease of abnormal trading to its normal levels. Therefore, with return of the trading activity to its normal level, stock price will also return to equilibrium, i.e. change in stock prices is temporary.

Beneish and Gardner (1995) provide a research of the effects of addition to/deletion from Dow Jones Industrial Average List (DJIA) on stocks. Their results have showed that nor trading activity, neither stock returns and neither trading volume are affected by the addition to the DJIA. Furthermore, researchers support the argument of asymmetric price reaction for added and delisted firms. However, authors also found that hypotheses stated for S&P 500 do not account for DJIA: there are no evidence whether DJIA provides information about future prospects of a company or an industry; there are also

no evidence of changes in fund demand for DJIA firms. In conclusion, researchers state that addition to DJIA does not significantly affect selected stocks because the editors of the Wall Street Journal make DJIA changes to include prominent, actively traded firms.

The debate about the information content of S&P 500 Index inclusion contributes to the further studies about the change in managers' behavior after the company is added to the Index. Denis, McConnell, Ovtchinnikov and Yu (2003) provide evidence that increase of the investors' scrutiny due to the addition to the S&P 500, leads to an increase of managerial efforts, which results in a better financial performance of the company. Dash (2002) has claimed that changes in index affect market level of scrutiny and analyst coverage of S&P 500 stocks. Indirect connection of S&P 500 inclusion and earnings quality is provided by Asthana and Kalelkar (2014): including in S&P 500 Index leads to decrease in audit fee for the newly added companies, while audit fee increases for the clients that exit from the Index. Martin, Thomas and Wieland (2016) reported similar results: inclusion to the S&P 500 leads to the less conservative financial reports, while deletion from the Index is associated with more conservative financial reports. Direct connection between S&P 500 membership and earnings quality were provided by Platikanova (2008): this study concludes that after being added to the Index companies experience a significant decrease in discretionary accruals.

Hrazdil and Scott (2009) question results of Denis et al.'s paper (2003) and provide evidence that are contrary to the conclusion of Denis et al. Hrazdil and Scott's findings reject the information content hypothesis: higher reported earnings of newly added firms are due to larger discretionary accruals, rather than for changes in operating cash flow. Furthermore, there is no evidence of connection between abnormal returns after the index inclusion announcement and reported positive unexpected earnings.

Analysts' awareness about the included firm also affect earnings management incentives. Brown (2001) has stated that meeting analyst forecast is a main driver in managers' decision to engage in earnings management. This claim has been supported by Abarbanell and Lehavy (2003): they provide an evidence that firms rated buy are prone to engage in earnings management to meet or beat analysts' expectations, while firms rated sell are less likely to commit earnings management. Bartov et al. (2002) revealed that outweighing rewards for successful in earnings management results in greater incentives to use meet or beat strategy. Graham et al. (2005) have found that managers receive greater market penalties for missing analyst forecast than for earnings management.

Another problem is to measure earnings management. Vast majority of previous researches use modifications of Jones model of discretionary accruals to measure earnings management. However, these models have proven to be ineffective to detect earnings management. One of the reasons is that earnings management has to be economically implausibly large (e.g., more than 5 percent of total assets) to be accurately picked up by these models. Furthermore, variations of Jones model suffer from major

estimation and statistical noise problems. Therefore, new model for detecting and measuring the earnings management is needed.

Dichev and Owens (2018) suggest "Accrual Duration" model. They explain that accruals are used as an adjustment to correlated cash flows that shift their recognition as components of income over time. Consequently, accruals work in pairs with associated cash flow: timing and magnitude of a cash flow pin down the timing and magnitude of associated accrual. Therefore, duration is a length of time between an accrual and underlying cash flow. This method aids in distinguishing between accruals: longer the duration – more discretionary the accruals, because uncertainty and the range of possible estimates increase over the longer time periods. Eventually, zero-duration accruals are non-discretionary, while positive-duration accruals are a function of manager discretion.

Burgstahler and Chuk (2017) suggest looking for discontinuity evidence. The logic behind their approach is that most of the earnings management occur when benefits of meeting analysts' forecast are greater than costs. As a result, discontinuity can be observed in earnings distribution at benchmarks: extremely large number of observations immediately above the benchmark and surprisingly low number of observations below the benchmarks. Therefore, authors suggest that premanaged earnings below the benchmark are transformed into reported earnings above the benchmark.

This study intends to contribute to the present literature in multiple ways. First, it can provide evidences for a direct correlation between S&P 500 addition and earnings management. Most of the studies focus on the information effect of the S&P 500 Index inclusion, while consequences of this addition on the earnings quality of the newly added companies remain nebulous. Secondly, this paper can provide an endorsement for the past findings. For instance, results from this research can assist in explanation of the difference in audit fees or in conservatism before and after S&P 500 addition. Lastly, the research question is strongly correlated with audit quality. Therefore, results of this paper can also be useful from audit perspectives.

4. Hypothesis development

Most of the studies that examine managers' behavior after the S&P 500 Index inclusion provide indirect correlation between addition to S&P 500 and earnings management. For instance, results of Asthana and Kalelkar (2014) can be described from two opposite points: decrease in audit fee after the Index inclusion can be done due to the belief of the auditors that earnings quality increase as a company is added to the index, but it can also be explained from the point of reputation effect, i.e. S&P's good reputation decreases the inherent risks. Same can be said about conservatism. Only one study provided a direct correlation between addition to the Index and earnings quality of the company (Platikanova 2008). Results of this research provide evidence that discretionary accruals of the company are lower after being added to the Index than before. The results of Platikanova's study are important, because they provide an insight that earnings management is affected by S&P 500 index addition even among

the companies that were added to the index. This study differs from Platikanova 2008, since it analyzes the difference in discretionary accruals between firms that were added to the Index and the benchmark group.

It is difficult to predict the direction and magnitude of the effect of S&P membership on earnings management, since there is a lack in literature reporting direct correlation between earnings quality or financial reporting quality and addition to S&P 500. Therefore, the hypothesis about relation between S&P 500 Index addition and earnings management is stated in null form:

H_1: Addition of the company to the S&P 500 Index will have no effect on earnings management of the newly added company.

Certification hypothesis proposes that index reputation might affect investors' perception of the stocks. Some researchers as Cai (2007) and Kappou et al. (2008) report that there is a significant increase in firms' earnings per share after the index addition. Contrary to that notion, Shleifer (1986) state that better firms' performance is not related to index addition, as abnormal returns are not correlated with bond ratings. Therefore, second hypothesis is also stated in null form:

H_2: Addition of the company to the S&P 500 Index will have no effect on earnings performance of the newly added company.

5. Methodology

In order to test the effect of S&P 500 Index addition on earnings management of newly added firms two following models are used: first, propensity score matching research design; second, accrual duration model of Dichev and Owens. As a final result, difference in differences test should be provided in order to compare the change in earnings management for companies added to S&P 500 to a matched sample of companies. Event window is [-1; +1], which means a year before and a year after membership. This window includes the year of addition for the PSM model, because changes in investors' reaction to the addition is observed in the first 30-45 days, starting from the addition date. Therefore, matching process should match added firms with non-members in all three periods: one year before the addition, year of addition, and one year after the addition.

In order to match non-members with firms added to S&P 500, propensity score matching is used. Propensity score matching research design is completely adopted from the study of Martin, Thomas and Wieland (2016):

$$SP500_{i,t} = \beta_0 + \beta_1 Size_{i,t-1} + \beta_2 TradVolume_{i,t-1} + \beta_3 Leverage_{i,t-1} + \beta_4 ROA_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

Primary aim of the propensity score regression made by Martin, Thomas and Wieland is to match each member company with a non-member, which makes further difference-in-differences test feasible. PSM model that presented here represents the same criteria that are used in S&P index addition. This

research matches companies in all three years, i.e. company that was added to the index should be matched with non-member in all the periods (pre-/post- and addition period). Apart from matching process this model is used to explain the relevancy of criteria used by S&P. Significant coefficients of dependent variables suggest that used criteria is relevant.

For measuring of earnings management this study uses an accrual duration model. This model consists of two steps: first – to split accruals into discretionary and non-discretionary, second – analyze positive-duration accruals.

The first step is to decompose accruals. Non-discretionary accruals are accruals of zero-duration, whose timing and magnitude is pinned down by their associated cash flow. This type of accruals has no interest for a research, because it doesn't implicate any managerial discretion behind it.

$$Discretionary\ Accruals = Total\ accruals - Nondiscretionary\ accruals \tag{2}$$

Non-discretionary accruals shift the recognition of concurrent associated cash flow by recording the same dollar amount with an opposite sign. Therefore:

$$Nondiscretionary\ accruals = -Concurrent\ Associated\ Cash\ Flow \tag{3}$$

Using expression (3), expression (2) can be transformed into:

$$Discretionary\ Accruals = Total\ accruals + Concurrent\ Associated\ Cash\ Flow \tag{4}$$

Expression (4) provides a solid representation of accounts, because their algebraic sign reflects the way they affect income, i.e. cash inflows appear as positive, while cash outflows – negative; increase in assets – positive accruals, increase in liabilities – negative accruals.

However, the major problem of this method is that current financial reports provide only a patchwork of necessary data. Companies provide aggregated data, which makes it complicate to find a correct pair for accruals.

As a result, statistical estimation is needed. Coming from an idea that discretionary accruals are those accruals, that are not associated with concurrent cash flow, expression (5) is built:

$$Accruals_t = \delta_0 + \delta_1 AssociatedCashFlow_t + \varepsilon_t \tag{5}$$

Discretionary accruals for period *t* are represented by residual term (ε_t), while non-discretionary accrual for the same period are predicted value ($Accruals_t - \varepsilon_t$).

Related researches use working capital accruals as it is by far most common accrual specification. Consequently, expression (5) becomes more specific:

$$WCAcrruals_{i,t} = \beta_0 + \beta_1 OpCashFlow_{i,t} + \varepsilon_{i,t} \tag{6}$$

WCAcrruals represent firm *i*'s working capital accruals (excluding depreciation) in year *t* computed from the cash flow statement as the sum of changes in non-cash working capital accounts. *OpCashFlow* is firm *i*'s operating cash flow in year *t*, where both variables are scaled by average total assets. Moreover, industry effects are included (two-digit SIC). Residual term is used as discretionary accruals, while non-discretionary accruals are described as a predicted value, mentioned above.

The final step of research is to measure the difference between discretionary accruals of newly added firms and benchmark firms. Propensity score matching will aid in finding benchmark firms, while Accrual Duration model is used to calculate the level discretionary accruals. Subtracting from expression's (6) values of residual term of the added firms' values of residual term of benchmark firms will reveal the difference in discretionary accruals.

The last part of the research is to examine whether index addition results in improved performance of the added firms. Therefore, the model (7) is going to be used:

$$EPS_{i,t} = \beta_0 + \beta_1 SP500_{i,t} + \beta_2 Size_{i,t-1} + \beta_3 TradVolume_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 ROA_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

EPS is used as a proxy for financial performance of an added firm. The variable of interest is SP500: significant results will prove that index addition affects firm's performance and the sign of the variable will reveal the direction of the effect. Variables as *Size*, *TradVolume*, *Leverage* and *ROA* are used as control variables, since they prescribe S&P's addition criteria.

6. Data selection

Data for S&P 500 addition was taken from WRDS: Index Constituents. Table 1 represents sample selection procedure. S&P added 477 firms to the S&P 500 Index during the period 2000-2017.

Table 1
Sample selection

Description	*Number of observations*
Firms added to S&P 500 (2000-2017)	477
Delete duplicate firm addition and firms added due to M&A activity	-216
Delete financial firms	-64
Delete firms missing financial information in current, pre- or post-period	-83
Observation used in PSM model	**114**
Delete firms with insufficient match	-7
Matched sample	107
Total sample	**642**

Notes:

The table presents sample selection process. All of the data is extracted from WRDS: Index Constituents and Compustat.

Due to the usage of the first date of addition and also ignoring firms that were added as a cause of spin-offs or another merger or acquisition activity 216 firms were deleted. Furthermore, 64 financial firms were deleted and 83 firms with missing financial information in current, prior or after the match year were excluded from the sample. As a result, 114 firms were used in propensity score matching model. The reason to exclude financial firms is because of the financial leverage: financial firms report high financial leverage and it is normal for this type of firms, while high level of leverage in nonfinancial firms is an indicator of financial distress. Distressed firms cannot be added to S&P 500. Therefore, financial firms are excluded from the sample.

The next step was a propensity score matching model that was supposed to match remaining 114 firms with a similar firm that was not selected in the same year, but potentially could have been. The addition criteria are similar to S&P's ones. The process matches all firms added to S&P 500 with all firms on Compustat based on the year of selection and industry division. Financial firms and firms that are not domiciled in US are eliminated from Compustat sample. Using the remaining sample of firms that were added to the index (114 firms) with Compustat sample (37871 observations), the model (1) is used.

Table 2
S&P500 Additions

$$SP500_{i,t} = \beta_0 + \beta_1 Size_{i,t-1} + \beta_2 TradVolume_{i,t-1} + \beta_3 Leverage_{i,t-1} + \beta_4 ROA_{i,t-1} + \varepsilon_{i,t}$$

	Estimate	*Std. Error*
Intercept	-9,8289***	0,4500
Size	0,7252***	0,0591
TradVolume	-1,98E-11	5,23E-10
Leverage	-2,1373***	0,5162
ROA	0,4005***	0,0840
No. S&P 500 additions	114	
Total observations	37871	
Presudo R-square	0,1377	
Likelihood ratio	668,90***	

Notes:

The model includes 114 firms added to the S&P 500 (*SP500* = 1) from 2000 to 2017 plus 37871 firm-year observations of non-member firms (*SP500* = 0). Inclusion criteria for 114 additions and 37871 potential matches are presented in Table 1. Following variables are used: *Size* (natural log of average total assets), *TradVolume* (average annual shares traded divided by average shares outstanding), *Leverage* (total liabilities divided by total assets), and *ROA* (income before extraordinary items divided by average total assets)

Table 2 reports the results of the PSM model. Results show that membership addition is positively associated with size and profitability, while negatively related to leverage. However, trading volume is not significant for the addition to the Index.

PSM model reports 7 membership firms were not able to be matched. Therefore, final sample consists of 107 firms that were added to S&P 500 plus 107 matches that could potentially be added to

the index. Furthermore, research takes into account pre- and post-period, and the year of addition. As a result, the total sample consists of 642 firm-year observations.

Table 3 presents the descriptive statistics for S&P 500 addition sample. Variables as *Income*, *Size*, *TradVolume*, *Leverage* and *ROA* represents the set of criteria stated by S&P. This statistic represents an average firm that could be potentially added to the Index: it should be profitable, large in size and in trading volume, also not leveraged by debts and report high return on assets.

Table 3
Descriptive Statistics for S&P 500 Addition Sample

Observations	N	Mean	Standard deviation	Min	Max
Income	642	414,8963	742,4221	-4556	9895
Size	642	8,4168	1,0566	4,4827	11,4531
TradVolume	642	2740579	1910062	31358,19	2,07E+07
Leverage	642	0,5420	0,2187	0,0611	1,3309
ROA	642	0,0692	0,0801	-0,4834	0,6107
PosDurWCA	642	4,55E-11	0,0361	-0,1487	0,1937
EPS	642	2,5498	4,2003	-52,84	38,55

Notes:

The table reports mean descriptive statistics of firms added to the S&P 500 and their matches. Variables *Size*, *TradVolume*, *Leverage* and *ROA* are described in the notes of Table 2. Variable *Income* stands for income before extraordinary items, *PosDurWCA* represents residual term from regression (6), *EPS* stands for earnings per share.

Descriptive statistics for variables used in accrual duration model are presented in Table 4. *WCAccruals* represents firm *i*'s working capital accruals in a year *t*, calculated as a sum of changes in non-cash working capital accounts, scaled by average total assets. *PosDurWCA* represents residual term from a pooled firm-year (within-industry) regression of *WCAccruals* on *OpCashFlow*, which stands for a measure of firm *i*'s positive-duration accruals in a year *t*. *OpCashFlow* picked as a proxy for firm *i*'s cash flow from operations in a year t, scaled by average total assets.

Table 4
Descriptive Statistics for accrual duration variables

Variable	N	Mean	St. deviation	P5	P25	P50	P75	P95
WCAccruals	642	0,0055	0,0368	-0,0506	-0,0089	0,0032	0,0187	0,0566
PosDurWCA	642	4,55E-11	0,0361	-0,0542	-0,0156	-0,0030	0,0135	0,0547
OpCashFlow	642	0,1228	0,0731	0,0259	0,0750	0,1099	0,1673	0,2492

Notes:

The table reports mean descriptive statistics for accrual duration variables. Variable *WCAccruals* represents firm's working capital accruals. Variable *PosDurWCA* represents residual term from regression (6). Variable *OpCashFlow* represents firm's cash flow from operations, scaled by average total assets.

7. Main Results

Main results are presented in Table 5. The sign of a *OpCashFlow*'s coefficient (β_1) is negative, which means that increase in cash flow from operations leads to a decrease in working capital accruals. This is logical, since accrual duration model prescribes that correlated cash flow pins down related accruals. Coefficients β_0 is significant at 10% level, while coefficient β_1 is significant at 5%.

Table 5
Accrual Duration model

VARIABLES	*WCAccruals*
OpCashFlow	-0.0867*
	(0.0423)
Constant	0.0161**
	(0.00519)
Observations	642
R-squared	0.028

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes:

Variables *WCAccruals* and *OpCashFlow* are explained in the notes of table 4.

Table 6 represents results of t-test. This study uses t-test in order to find if the difference in discretionary accruals is significant. Table 6 portrays the mean, standard error and standard deviation of discretionary accruals and distinguishes between treatment and benchmark group. *SP500 = 0* reports results of potential matches, while *SP500 = 1* stands for the firms that were added to the Index. The test reports significant results that the difference is other from zero. Furthermore, test results also report significance that difference is less than zero. The following conclusion from the t-test could be stated: since the difference in discretionary accruals is significantly less than zero, firms added to the S&P 500 Index tend to engage more in earnings management than their potential matches.

Table 6
Difference in discretionary accruals

SP500	Obs	Mean	Std. Err.	Std. dev
0	321	-0,0057	0,0018	0,0331
1	321	0,0057	0,0021	0,0380
combined	642	4,55E-11	0,0014	0,0361
diff		-0,0114	0,0028	

diff = mean(0) - mean(1)		t=-4,0647
H0: diff =0		degrees of freedom = 640
Ha: diff < 0	Ha: diff !=0	Ha: diff >0
Pr(T<t) = 0.0000	Pr(|T| > |t|) =0.0001	Pr(T>t) = 0.9998

Notes:

0 represents the descriptive statistics of discretionary accruals for firms that potentially could have been added to the index. 1 represents the descriptive statistics of discretionary accruals for firms that were added to the index.

Accrual duration model resembles Dechow's and Dichev's variation of Jones model. Both models have similar approach: cash flow pins down accrual created for previously recognized cash disbursements/payments or anticipated future cash collections/payments (Dechow and Dichev 2002). Dechow and Dichev claim that larger standard deviation in residuals warns about less persistent earnings, which lowers accruals' quality.

Table 6 also provides descriptive statistics of discretionary accruals, divided by two sections: S&P 500 Index additions and potential matches. *SP500=1* represents group of firms that were added to the Index, while *SP500=0* provides results of potential matches. The focus is on standard deviation: descriptive statistics shows that standard deviation is higher for the firms that are added to the Index, therefore, according to Dechow and Dichev these firms are more prone to earnings distortions. This result supports the conclusion of the current research.

In order examine whether index addition affects financial performance of a firm, a regression (7) is used.

Results of this regression are presented in Table 7. The variable of interest here is *SP500*, which is a dummy variable, created in order to distinguish between treated and control group. The sign of coefficient of variable *SP500* is positive, but the results are insignificant. Therefore, there are not enough evidence to examine how S&P 500 Index addition affects firm's performance.

Table 7
Firms' performance and Index addition

VARIABLES	*EPS*
SP500	0.489
	(0.300)
Size	1.045***
	(0.144)
TradVolume	-7.86e-08
	(2.27e-07)
Leverage	-0.616
	(0.916)
ROA	9.652***
	(0.909)
Constant	-6.455***
	(1.442)
Observations	642
R-squared	0.072

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes:

Variables *SP500, Size*, *TradVolume*, *Leverage* and *ROA* are described in the notes of Table 2. Variable *EPS* is described in the notes of Table 3.

8. Notes on Accrual Duration Model

The accrual duration model implies using residual term as a proxy for discretionary accruals. Research design prescribes using these residuals in a further test of differences. However, this can cause a set of problems, the most important of which is endogeneity.

Endogeneity problem arises when residuals from Dichev's accrual duration model are used as dependent variables in further regressions. Usage of the residual from first – step regression as a dependent variable in a second – step regression results in a biased coefficients and unreliable t-statistics (Chen, Hribar and Melessa 2018). Furthermore, the probability of receiving Type I or Type II error dramatically increases. However, this problem is not relevant for this research, since the methodology prescribes using only first-step regression, which is accrual duration model and comparing the difference between residuals.

Furthermore, results, provided in Table 5, shows that Dichev's accrual duration model lacks explanatory power, since it explains only 2,8% of the variation in accruals. Jones model and its modifications report better results in general: all these models report R^2 at a level of 12% (Dechow, Ge and Schrand 2010). Yet, it's unknown if Jones model would come up with greater results in this

particular research. Therefore, this research could be broadened up, by providing a comparison between results of Jones model or any of its modified versions and results of Dichev's accrual duration model.

In addition, similarity between accrual duration model and Dechow and Dichev approach to Jones model hints that Dichev's accrual duration model has the same limitations as modified Jones model. Accrual duration model is unable to identify misrepresentations induced by long-term accruals, since the model focuses on short-term changes in working capital accruals. The model could take into account long-term accruals by including PPE impairments and goodwill.

9. Conclusion

This study examines the relation between S&P 500 Index additions and earnings management of the firms added to the Index. The firm that is added to the Index experiences changes in its information environment. Addition to S&P 500 results in an increased investors' awareness, which gives incentives to firms' managers to engage in earnings management. Therefore, this study gathers a data sample that could represent firms that were added to the Index and their matches, i.e. potential firms that could have been added to S&P 500.

Methodology of this research bases on two models: first is PSM model, that was used by Martin, Thomas and Wieland (2016), second – Dichev's accrual duration model. This study states hypothesis in null form, i.e. S&P 500 Index addition has no effect on earnings management of newly added firms. Results of the research have showed that there is a significant difference in the level of discretionary accruals between newly added firms and their matches. Furthermore, the difference is significantly less than zero. Therefore, these results suggest that newly added firms tend to engage more in earnings management than their potential matches. Also, standard deviation check has provided additional evidence that is consistent with the main findings of this study. As for the firms' performance after index addition, the examination of the effect of S&P 500 addition on earnings performance of added firms didn't provide any significant results.

One of the most important limitation of this research is the use of the accrual duration model. This model has been proposed in 2018 and there weren't any other studies that could have used accrual duration model. Furthermore, accrual duration model implies certain restrictions as describing accruals only from the perspective of cash flow. As a result, the link between firm's performance and level of accruals is unexplained. Another limitation is propensity score matching. The matching process has cut more than 50000 observations, leaving only a small sample of firm-year observations.

This research could be broadened by answering the question of the best accrual model. Comparison of results from Jones model, one of its modification and accrual duration model could provide valuable insights on accuracy of each model. Furthermore, there is a strong correlation between earnings management and audit fees. This study evidence that firms added to S&P 500 report higher discretionary accrual, which results in a lower earnings quality. On one hand, audit fees should be higher

for firms engaged in earnings management. On the other hand, index reputation could affect audit firms more, i.e. working with a client that is added to S&P 500 could provide more benefits, than from audit fees.

10. References

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