Charles University

Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

Does the Accrual Anomaly Persist?
Evidence from the U.S. Stock Market

Author: **Bc. Michal Kolář**
Supervisor: **prof. Ing. Evžen Kočenda M.A., Ph.D., DSc.**
Academic Year: **2016/2017**

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.

The author grants to Charles University permission to reproduce and to distribute copies of this thesis document in whole or in part.

Prague, July 31, 2017

Signature

Acknowledgments

I am grateful to my supervisor, prof. Ing. Evžen Kočenda M.A., Ph.D., DSc. for his insightful comments, encouragement and willingness to answer my questions. Furthermore, I would like to thank you to my mother, grandmother and other members of my family for all the support and to PhDr. Jiří Kukačka Ph.D., Petr Ščučinský and Alena Stifterová for the help with downloading the data.

Abstract

Understanding what drives stock returns is an essential question for investors, financial institutions, and economists. The question is important not only for individuals, but also for the overall economy, as forms of inefficiency such as bubbles can lead to stock market crashes that have a negative impact on the real economy itself. In contrast to the Efficient Markets Hypothesis, which posits that the stock market is efficient at correctly pricing stocks, the accrual anomaly is an example of one of the largest inefficiencies in the equity market. The aim of this thesis is to examine if the accrual anomaly has lessened in recent history. We analyze if the increasing trend of institutional funds trading on accrual mispricing, the increasing presence of cash flow forecasts, or earnings quality could be responsible for mitigating the accrual anomaly effect. A robust MM regression is used to assess the anomaly alleviation. The analysis focuses on the US stock market. We confirm the mitigation of accrual mispricing based on the increase in trading on the accrual anomaly and quality of earnings for the period from 1991 to 2015, but not the growing number of cash flow forecasts.

Keywords arrcual anomaly, earnings quality, institutional funds, cash flow forecast

Author's e-mail michal.kolar81@gmail.com
Supervisor's e-mail kocenda@fsv.cuni.cz

Abstrakt

Pro investory, finanční instituace i ekonomy je důležité vědět, co způsobuje výkyvy cen akcií a jejich výnosy. Není to důležité jen proto, že investoři mohou rozpoznat pravou příčinu pohybů cen akcií, ale akcie a akciové trhy celkově jsou vnímány jako teploměry celé ekonomiky. Hypotéza efektivních trhů předpokládá, že akciové trhy jsou oceněny efektivně. Akruální anomálie je však příklad jedné z největších neefektivností na akciovém trhu. Cílem této diplomové práce je zkoumat, zda se akruální anomálie začala v nedávné době zmenšovat. Analyzujeme, zda zvětšující se počet institucionálních fondů obchodujících s využitím akruální anomálie, přítomnost cash flow odhadů a kvalita zisků, můžou být příčinou pro zmenšení efektu akruální anomálie. Robustní MM regrese je použita pro odhad toho, zda se efekt akruální anomálie zmírňuje. Analýza se soustředí na akciový trh Spojených států amerických. Pomocí estimací potvrzujeme, že se velikost akruální anomálie zmenšuje díky institucionálním fondům obchodujícím "na" tuto anomálii a také díky kvalitě reportovaných zisků pro sledované období od roku 1991 do 2015. Přítomnost cash flow odhadů, podle našich výsledků, nemá vliv na velikost akruální anomálie.

Klíčová slova akruální anomálie, kvalita zisku, institucionální fond, cash flow odhady

E-mail autora michal.kolar81 @gmail.com
E-mail vedoucího práce kocenda@fsv.cuni.cz

Master's Thesis Proposal

Institute of Economic Studies
Faculty of Social Sciences
Charles University

Author:	**Bc. Michal Kolar**	Supervisor:	prof. Ing. Evžen Kočenda PhD.
E-mail:	michal.kolar81@gmail.com	E-mail:	kocenda@fsv.cuni.cz
Phone:	739 383 579	Phone:	222 112 321
Specialization:	FFM&B	Defense Planned:	September 2017

Proposed Topic:

Does the Accrual Anomaly Persist?
Evidence from the U.S. Stock Market

Motivation:

We know that it is the aim of an investor to look for equity anomalies and exploit them at the best possible way. We also know that it is important to examine stock markets because they often behave similar as the overall economy. One such anomaly is accrual mispricing. However, there has been presented some studies in the recent history which have shown that the accrual anomaly might mitigate nowadays.

Accrual anomaly is one of the anomalies "coming" from the financial statements. It has been comprehensively introduced by Sloan (1996) and then confirmed many times by different economists (Beaver, 2002). It was the most robust equity market anomaly at the time of its discovery (Zacks *et al.*, 2011). But the situation might have changed in recent history.

Bhojraj, Sengupta and Zhang (2009), Green *et al.* (2010) and Mohanram (2014) show that the anomaly may mitigate nowadays. They present variables that could contribute to the alleviation of the accrual mispricing.

They examine that the accrual anomaly mitigation might come from the earnings quality, magnitude of trade on the accrual mispricing and increase in number of cash flow forecasts.

These results are rather new and not verified comprehensively yet. It is reason for us to collect up-to-date data and examine if the accrual anomaly persists.

Hypotheses:

1. Hypothesis #1: Trade on the accrual mispricing does not mitigate the accrual anomaly.
2. Hypothesis #2: Earnings quality does not alleviate accrual anomaly.
3. Hypothesis #3: Presence of cash flow forecasts does not mitigate accrual mispricing.

Methodology:

The first step for this thesis is the collection of previous studies. We will mention papers and textbooks concerning value relevance, accrual anomaly and other concepts such as equity anomalies. We will present the conceptual theory that seems to be not connected to one paradigm yet.

We will look for most recent corporate data with long-term history on stock-exchange in U.S. matket. We want to collect substantial amount of data to present sufficient results. We expect to use resources such as yahoo.finance.com, ThompsonReuters, Bloomberg to collect data about stock prices and financial statements.

We want to use robust MM regression. We are inspired by the research from Mohanram (2014) where the robust MM regression approach was applied. We want to study if the accrual anomaly mitigate nowadays and check for variables that could drive this alleviation.

Expected Contribution:

We will conduct robust estimations analyzing substantial amount of corporate data coming from United States. These estimations will examine if the proposed proxy variables mitigate accrual anomaly. We will study the accrual anomaly alleviation particularly for the long term period and short term period. We will control for sample selection bias.

Outline:

1. Motivation: Papers examining the mitigation of accrual anomaly are new. We want to extend the research with the usage of contemporary data and verify if the suggested theory is valid.
2. Theory: We will describe why accrual anomaly drives future stock returns and why this anomaly might mitigate considering economic theory and empirical research.
3. Data and Methodology: We will explain how we will collect accounting and stock prices data and which models and how will be used.
4. Results: We will discuss estimated results and compare them with the theory and previous empirical findings.
5. Concluding remarks: We will summarize findings and their implications for future research.

Core Bibliography:

Beaver, W.H. Perspectives on Recent Capital Market Research. *The Accounting Review*. 2002, **77**(2), 453-474.

Bhojraj, S., P. Sengupta and S. Zhang. 2009. Restructuring charges, regulatory changes and the accruals anomaly. *Working Paper*, Cornell University/George Mason University.

Green, J., J. R. M. Hand, and M. Soliman. 2010. Going, going, gone? The demise of the accruals anomaly, *Management Science.*

Malkiel, Burton G. and Eugene F. Fama. Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*. 1970, 25 (3): 383-417.

Mohanram, Partha S. Analysts' Cash Flow Forecasts and the Decline of the Accruals Anomaly. *Contemporary Accounting Research*. 2014, 31(4), 1143-1170.

Zacks, Leonard, ed. The handbook of equity market anomalies: translating market inefficiencies into effective investment strategies. 2011. Vol. 2. John Wiley & Sons.

Author **Supervisor**

List of Tables vii
List of Figures viii
Acronyms ix
1 Introduction 1
2 Literature Review 3
2.1 Stock and Stock Exchange Definition 3
2.2 Efficient Market Hypothesis 7
2.3 Stock Valuation 8
2.4 Connection between Dividend, Net Income, Accruals, Cash Flow and Stock Returns 10
2.5 Equity market anomalies, Accruals 15
3 Data and Methodology 21
3.1 Data 21
3.2 Methodology 23
4 Estimation 32
4.1 Descriptive statistics 32
4.2 Accrual anomaly and hedge returns 35
4.3 Accrual anomaly, robust regression and time 39
4.4 First stage estimation of Heckman's model using probit 41
4.5 Accrual anomaly, robust regression and cash flow forecasts 43
4.6 Accrual anomaly, robust regression, institutional funds and quality of earnings 47
5 Conclusion 52
6 References 55

List of Tables

Table 1: Descriptive statistics 33
Table 2: Correlation matrix- Spearman's coefficients (above), p-values (below) 34
Table 3: Descriptive statistic- comparison between companies with and without cash flow forecasts 35
Table 4: Descriptive statistics 37
Table 5: Comparison of change in net operating assets hedge returns 38
Table 6: Development of the accrual anomaly through time 40
Table 7: Probit with CFF dependent variable representing first stage equation for Heckman two stage estimation 41
Table 8: Probit with CFF dependent variable representing first stage equation for Heckman two stage estimation 42
Table 9: Development of accrual anomaly through time 44
Table 10: Development of accrual anomaly through time 46
Table 11: Factors mitigating accrual anomaly 49
Table 12: Factors mitigating accrual anomaly (from 2011 to 2015) 51

List of Figures

Figure 1: 6
Figure 2: Porter's five force diagram 11

Acronyms

ABSACC	Absolute Value of Total Accruals
AT	Average Assets
CAPINT	Capital Intensity
COA	Current Operating Assets
COL	Current Operating Liabilities
CFD	Cash Flow Dummy Variable
CFF	Companies with Cash Flow Forecasts
EQ	Proxy Quality of Earnings
EBIT	Earnings Before Interest and Taxes
FIN	Net Financial Assets
ΔFIN	Change in Net Financial Assets
FINL	Financial Liabilities
$HRET_{\Delta NOA}$	ΔNOA Hedge Returns
I/B/E/S	Institutional Brokers' Estimate System
IF	Proxy Natural Logarithm of Assets Managed by Hedge Funds
IPO	Initial Public Offering
IM	Inverse Mill's Ratio
LMCAP	Natural Logarithm of Market Capitalization
N	Number of Observations
NCO	Net Non-current Operating Assets
ΔNCO	Change in Net Non-current Operating Assets
NCOA	Non Current Operating Assets
NOA	Net Operating Assets
ΔNOA	Change in Net Operating Assets
NCOL	Non Current Operating Liabilities
NNM	NASDAQ National Market
NSCM	NASDAQ Small Capitalization Market
OSAR	Abnormal Future Returns
PEAD	Post Earnings Announcement Drift

PEST	Political, Economic, Socio-cultural and Technological Factors
ROA	Return on Assets
SOX	Sarbanes-Oxley Bill
TACC	Total Accruals
U.S.	United States
U.S.A.	United States of America
VOL	Proxy Volatility of Cash Flows
WC	Net Working Capital
ΔWC	Change in Net Working Capital
Z	Altman's Z-score

1 Introduction

A perennial question in the finance literature is whether or not accounting information provides information relevant to decision-making for individuals using financial statements, such as stock market traders. It is crucial to know what drives changes in stock returns. It is essential not only because of the potential for making money on the stock market but also because of the concurrence between financial crises and stress and falling stock returns.

Many past economic studies have been carried out to prove the connection between stock prices and new releases of accounting information such as earnings reports (Beaver, 2002; Beisland, 2009). In 1996, Sloan clearly and comprehensively introduced the concept of accrual anomaly. He showed that holding the stocks of firms with the lowest (negative) accruals and shorting companies with the highest (positive) accruals led to significant hedge returns. It means that accruals are negatively associated with future stock returns. Since the time of Sloan, there has been many studies that have observed accrual anomalies (Zacks *et al.*, 2011). We have evidence from the recent past that this anomaly has become significantly less pronounced after the beginning of analyst cash flow forecast coverage (Mohanram, 2014; Radhakrishnan and Wu, 2014), as institutional funds trade on the accrual anomaly (Green *et al.*, 2010) and the increase in quality of earnings (Sengupta and Zhang, 2009). We assume that economic linkages can change through time, therefore it is possible also for the accrual anomaly to change. If the magnitude of the accrual anomaly has changed in recent years, then this would be an essential finding and would change the overall view of the accrual anomaly.

The main objective of this thesis is to test the hypothesis that earnings quality, trade on the accrual anomaly strategy and the presence of cash flow forecasts do not mitigate accruals mispricing. A comprehensive approach based on the use of the contemporary U.S. stock market data covering a relatively long period constitutes the

value added of this research. The data comes from the period between 1991 and 2015, including the period immediately following the global financial crisis.

We research contemporary data because the relationship between accrual anomaly and the variables could change through time. We employ a robust regression approach to investigate the impact of institutional funds trading on the accrual mispricing and to study the influence of earnings quality. We first run the regression for the whole sample, and then estimate it for values between 2011 and 2015. We also use a robust regression approach that takes into account sample, subsample and sample selection bias to examine the impact of cash flow forecasts.

The research in this thesis is organised in the following way. The second chapter discusses the theoretical background of the thesis and former related studies. The third chapter is about the data and methodology used. The fourth chapter presents empirical results and their critical evaluation. Chapter five summarizes the previous findings.

2 Literature Review

2.1 Stock and Stock Exchange Definition

A “stock” is a security representing a real part of a given company. It is represented by an officially recognized sheet or “electronic signature.”

It represents an ideal share of the ownership of a joint stock company. Companies produce stocks to retrieve money for setting up a business or their development.

Two types of stock exist in the market. Common stocks are shares representing the ownership of a company. It means that a shareholder has a claim on a portion of profits when distributed (called dividends), a voting right at the general meeting and the right to the remaining equity in the case of liquidation. Stock owners have one vote per share to elect board members at the general meeting. General meetings are supervised by the company management. The claim on remaining equity after bankruptcy is subordinated to debt. Common stock is widely used and traded. Preferred stock is a kind of a hybrid between common stock and debt. It has usually fixed dividends with superiority to common stock in its payment. It normally does not possess any voting rights. When the company ceases to exist, preferred stocks have a senior claim compared to common stocks but a subordinated claim to debt (Fabozzi, 2002).

As generally accepted, the first stock exchange was set up in 1531 in Antwerp. In that time there were no official company shares that were traded (Smith, 2004). Nowadays, we have many stock exchanges around the world providing thousands of stocks to buy. Basically, a stock exchange means an exchange of a stock between one investor who buys on one side and another investor who sells the stock on the other side. If there is no demand or supply for a stock it means that no trade deal will be realized. If there is a demand and supply it still does not mean that

a trade deal will be realized. The seller and the buyer need to agree on the price and volume traded. There are two possible ways to trade stocks on a stock exchange. It is the primary and secondary market. The primary market is where new shares are first traded through an initial public offering. The secondary market is where issued stocks are already traded.

In the primary market, the share price is evaluated by investment banks with the agreement of the company which will provide its ownership shares. After evaluation, institutional investors such as hedge funds and banks purchase most of the stock. The secondary market is a place where shares are traded by individuals and institutional investors, and change hands from the first public offering until the termination of companies.

Trading hours of stock exchanges run continuously around the world. The most important trading centers are London, New York and Tokyo. We introduce the secondary stock market participants based on the example of the New York Stock Exchange system. All world stock exchanges do not have the same system as the New York Stock Exchange but basic principles of participation go for every stock exchange. Market makers are single specialists who focus on one stock and have to provide bid and offer prices for it. Their profit is represented as the difference between the offer and bid prices which they provide. Market makers have to fulfill some rules given by stock exchanges such as providing high liquidity and a maximum spread between offer and bid prices. A market maker is either an employee or a software application provided by a trusted large, private company.

Other participants at the New York Stock Exchange are commission brokers. Commission brokers trade stocks on behalf of customers. They just follow their instructions and get a commission fee for the mediation. At the New York Stock Exchange, there are nearly 500 companies which provide these services. Independent floor brokers help exchange members to satisfy their orders. They help other members if they cannot carry out orders themselves or if they have big orders. They receive commission fees in return. Last participants involved at a stock exchange are registered traders. They trade on their own or occasionally represent entities to save money on the fees. Traditional stock exchanges have free entry, are very liquid and accommodate a vast number of sellers and buyers trying to create perfect

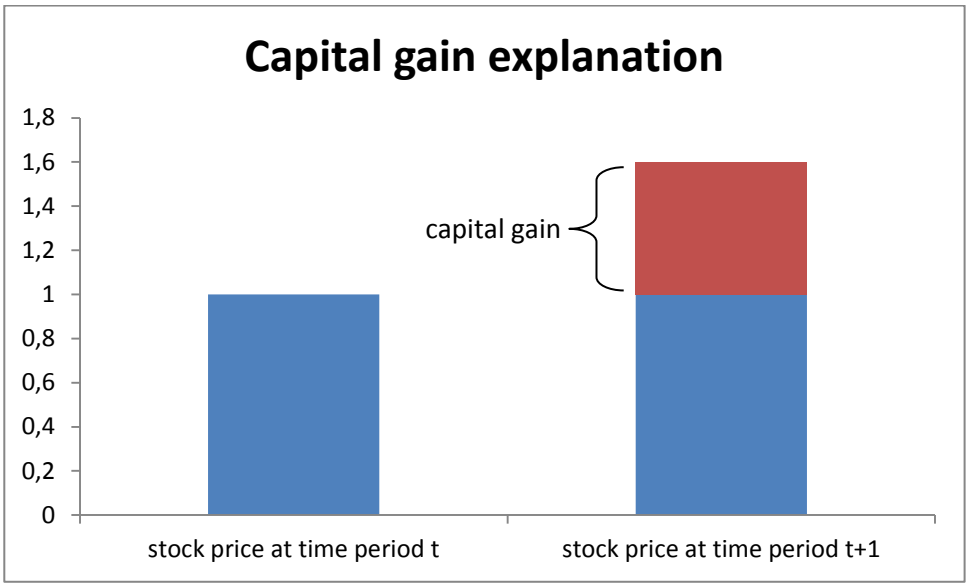
competition. This process should provide the smallest gap between bid and offer prices and security. It is an auction system organized at one point.

In addition to stock exchanges, which are considered to be traditional places for trading securities, there is another type of a secondary market called the 'over the counter' market. The over the counter market works in a very different way than traditional stock exchanges. It does not have one point (floor) where trades are settled. It works on the principle of negotiation. It means that sellers negotiate directly with buyers and other way around. The intermediary in over the counter market is a telecommunication system. There are no listed stocks in the over the counter market. Listed stocks are traded on traditional stock exchanges. Unlike the unlisted stocks, listed stocks have to meet some requirements such as particular asset value and earnings quality. Company also has to issue at least a given number of shares and pay a significant listing fee. Unlisted stocks do not have to satisfy such conditions, therefore it is sometimes more convenient for firms to go to the over the counter market. On the other hand, the over the counter market is not so liquid and stocks there may be considered to have lower quality.

The NASDAQ is a special type of the over the counter market because it possesses some characteristics of traditional exchanges. NASDAQ is the second largest stock market in the U.S.A. NASDAQ does not have one point of settlement. Securities are traded through an electronic system. NASDAQ consists of two security groups. The groups differ in capitalization size. The first one is called the NASDAQ National Market (NNM) system and the second one the NASDAQ Small Capitalization Market (NSCM). A company has to fulfill some requirements to get to and stay at NASDAQ. NNM has more restrictive requirements than NSCM. On the other hand, NNM has less restrictive rules than the New York Stock Exchange. For example, there are no profitability rules at NASDAQ and rules about capitalization are also weaker. If companies grow large they sometimes switch from NASDAQ to the New York Stock Exchange (not the other way around). Even though NASDAQ is the biggest over the counter market in United States, most of the securities are not traded there. Genuine over the counter markets in the United States are for instance OTC Bulletin Board and Pink Sheets. Both these markets are electronic but final agreements are settled through phones (Fabozzi, 2002).

Investors buy stock because of the returns that they expect to receive from holding the equity into the future. The gain comes from two sources. The first source is capital gains and the second one is dividends. A capital gain (or loss) is the difference between the current and the future stock price represented at one specific moment (figure [1]). For example, when an investor buys a stock and then the company goes bankrupt and stays with a zero residual value, a capital loss is the original price of the share. The second profit coming from holding the equity is the dividend, which represents a share in company's net income. A company may but does not have to pay dividends. There is no strict rule to enforce paying dividends. Companies may pay dividends even if they do not produce any profit, and on the other hand, do not have to pay dividends even if their profit rises rapidly.

Figure 1:



Source: Own calculations

2.2 Efficient Market Hypothesis

The efficient market hypothesis states that asset prices fully reflect all available information. Fama *et al.* (1970) points out that stock prices always trade at their fair value. It means that there is no possibility to beat the market. It means that stock market immediately absorbs any kind of information and reflects it in the prices. It connotes that stocks on the market are valued precisely.

The market has to fulfill these assumptions to be effective:

1. A large number of rational investors participate in the market. They constantly analyze, value and trade. No investor can influence the stock prices on his or her own.
2. Investors have enough cheap, present and true information available. All investors acquire new information around the same time.
3. Investors react precisely and quickly on every new piece of information.

Deals on the market are associated with low transactional costs and there are no trade restrictions on the market.

Fama *et al.* (1970) suggests that stock markets can have different kinds of efficiency such as:

- The weak form of efficiency means that the present stock prices reflect all information which could be acquired from historical data. In this case, analysts cannot predict future price behavior based on historical data and changes in prices are random.
- The medium-strong form of efficiency is a situation when stock prices do not only incorporate historical data but also reflect the current public information. It basically means that there is no possibility to find undervalued or overvalued stocks in the market, and that therefore analytical predictions lose meaning.

- The strong form of efficiency is equal to the state when stock prices incorporate all information, both historical prices and public information and all private information. In this kind of situation not even all predictions do not make sense, but also the usage of private information is useless.

The efficient market hypothesis (EMH) has been criticized many times, and there exist number of investors such as Warren Buffet who have consistently beaten the market over the long-term period (Why some succeed, 1994). Thus, the EMH is not usually taken to be 100% correct in its strongest form, but is rather conceived as an ideal model from which reality deviates.

2.3 Stock Valuation

Stock prices are affected by many variables but it is generally an impossible task to find out all these variables and their importance. There is no reliable method to determine the "right" value of a stock (Jílek, 2009). Jílek says that stock valuation methods pay attention only to some factors which determine the value of a company but do not take into account and even cannot in any case consider all important factors. Moreover, the significance of factors change through time and it is very hard to determine the change in stock prices before it really happens.

According to Fabozzi (2002):

> "Currently, there are appraisal professionals who use the three methods to estimate an asset's value; the cost approach, the comparables approach, and the income approach. In the world of modern finance only the income approach has any real merit, as it is essentially a discounted cash flow method, exactly as used for other assets." (Fabozzi, 2002, p. 735)

A stock is a kind of security but how it is valued and which techniques are used for the valuation? Fabozzi says that stock valuations can be grouped into two general groups called the active and the passive strategies. The passive strategies are based on the Efficient Market Hypothesis. On the contrary, the active strategies try to

outperform the market and are further divided to three groups. The first group takes into account transaction timing. The second group aims to identify undervalued or overvalued stocks. The third group tries to exploit any kind of market anomalies (Fabozzi, 2002).

Fundamental analysis is the technique used by investors that believe in the active undervalued strategy. It builds on fundamental company's data such as earnings investigation, debt burden, profitability, cash flow, management quality and long-term ability to produce profit. It analyzes also other factors such as industry specific criteria,[1] macroeconomic variables, GDP, employment, inflation, economic cycle, money base, exchange rate, government expenditures, payment balance, politics, development within an industry, availability of inputs, technology and other progress, overall indebtedness etc. Fabozzi (2002) claims that fundamental investors use valuation models called the discounted cash flow model, capital asset pricing model and the multi-factor asset pricing model.

Jílek (2009) claims that profit is the most important parameter in the stock valuation. We will get to this point later on in the study.

Technical analysis is the technique used by investors who believe in timing the selection of transaction. It does not take into an account company's economic situation. It is based on published stock market data. These data consist of stock prices development, trading volumes and technical indicators. This technique is used to predict short-term price movements. Technical analysis consists of a wide range of methods from easy ones to hard econometrical models. The basic point is that the stock price presents trends through its lifetime. These trends are discovered by investors and then used in the future to predict similar situations. For example, consider a stock price with an increasing long-term trend and a repeating sine oscillation around this trend. When sine goes down it is time to buy the stock because it will go up again in the future because of the increasing long-term trend.

Some investors use a mixture of fundamental and technical analysis. In that case the fundamental analysis is used for picking undervalued stocks and the technical analysis for transaction timing.

[1] One example of such industry analysis is Porter's Five Forces.

Market anomaly analysis is based on the inefficiency of stock markets. Investors who believe in this analysis follow patterns that recur through the time on the market. These patterns produce positive abnormal returns, if properly exploited. Fabozzi (2002) names anomalies that are commonly used by some investors: "the small-firm effect, the low-price-earnings ratio effect, the neglected-firm effect, and various calendar effects." Zacks *et al.* (2011) introduces the whole book about equity market anomalies. They present different types of anomalies divided into particular chapters: the accrual anomaly, the analyst recommendation and earnings, post earnings announcement drift and related anomalies, fundamental data anomalies, net stock anomalies, the insider trading anomaly, momentum: the technical analysis anomaly, seasonal anomalies and size and value anomaly. The equity market anomalies and especially accrual anomaly are discussed in more detail later on.

A subset of the anomaly analysis is psychological analysis. Some authors view psychological analysis as a subset of equity market anomalies (Zacks *et al.*, 2011). On the other hand, some economists consider it as an individual part of the theory (Jílek, 2009). Psychological analysis helps to predict the behavior of individuals. It builds on the opinion that investors' decisions are greatly affected by emotions. According to crowd psychology, people never act in isolation from the impact of the outside world, but rather behave in accordance with the crowd. Only strong individuals have ability to not succumb to crowd behavior.

2.4 Connection between Dividend, Net Income, Accruals, Cash Flow and Stock Returns

Investors care about the amount of dividends received and capital gains, but where do these values come from?

It is important to know what variables have an impact on firm's activities, because its net income, cash flows and accruals originate from the company

performance, while the performance depends on the current market and environment situation. Porter's "Five Forces" introduced by Porter (2008) represent the powers that come from the industry. It consists of supplier power, buyer power, competitive rivalry, the threat of substitution, and the threat of new entry. An example of Porter's five force diagram is shown in figure [2] below. PEST analysis introduced by Aguilar in 1967 is a good tool for analyzing business environment. PEST is acronym for political, economic, socio-cultural and technological factors. Even though it is important, we do not examine business performance from this point of view in the thesis. We continue exploring technical issues that matter in any company such as company profit, cash flow, dividends and stock price.

Figure 2: Porter's five force diagram

Source: https://www.mindtools.com/pages/article/newTMC_08.htm

We describe how net income is assembled in the following sections. The first part of the formula is EBIT. EBIT is an abbreviation for earnings before interest and taxes. EBIT comes from operating and non-operating activities of a company. These activities incur costs and collect revenues. Revenue is the income from customers related to the current year and costs are expenditures regarding company business

related to the current year as well. The most important cost is the cost of goods sold. The cost of goods sold represents a cost directly connected to the core business of a company. Here are some examples: traffic of equipment or labor wages in a factory or price of ingredients and cooks wages in a pizzeria. Another important cost is selling, general and administrative expenses. This cost relates to direct and indirect selling expenses, general operating expenses directly related to the general operations of the company and administration expenses (which consist of executive salaries), general support and taxes. A further important cost is created by tangible assets, intangible assets and natural resources. All these assets lose their value throughout the years until there is no asset. This loss (cost) is represented in financial statements as a percentage of original value incurred every year. When the sum of all past accumulated losses (costs) is equal to the original value of an asset, the asset has no value and it is considered no longer to be an asset[2]. This cost is represented by three groups: amortization (intangibles), depreciation (tangibles) and depletion (natural resources). Following formula show EBIT decomposition:

$$EBIT = revenues - cost\ of\ goods\ sold - \\ -selling, general\ and\ administrative\ expenses - \\ -depreciation - amortization - depletion$$

The orporate tax rate is a percentage part of the EBIT. It has to be paid to the state where the company operates. The interest expense represents the cost paid to creditors in a return for borrowing money.

Dividends are paid out in three forms: cash dividends, stock dividends and property dividends. Common way to pay out dividend is cash. It is usual that dividends are paid annually (Europe) or quarterly (United States). Also one-off dividends occur on the market.

There are many studies showing that on ex-dividend day stock prices decrease almost by the same amount as dividend amount itself[3] (Borges, 2008).

[2] This does not have to be truth in reality.

[3] Yet, there is a significant difference between an ex-dividend change of the stock price and the amount of dividends (Borges, 2008).

Dividends are paid out to investors which hold the company stocks. It comes from company's free money. Free money is acquired from company's operations.

Company profit can be used in two possible ways. It can be paid out as dividends or retained in the company:

$$Net\ Income => Dividends + Retained\ Earnings$$

It means that book value of equity changes in a simple example as follows:

$$Book\ value\ of\ equity_t = Book\ value\ of\ equity_{t-1} + Earnings_{t-1} - Net\ Dividends_{t-1}$$ [4]

Investment is done usually for two important reasons. The first reason is to maintain company's profit which normally connotes something like replacing an old machine in a manufactory and building a new store instead of an old ruined one. It basically means to replace obsolete or old capital with capital which has the same productivity. It is called the gross investment. The second reason is to increase present profit. It means buying new capital which contributes to the productivity that enhances the mentioned profit. It is called net investment (Fabozzi, 2002).

We expect that an increase in net income is considered by investors either as a growth in assets which will cause a growth in future profits or an increase in dividends. Summarizing all the information, we suggest that a rise in dividends and an increase in assets cause a growth in stock prices. Net income determines the amount of dividends and a rise in assets therefore we claim that a positive (negative) change in net income should, ceteris paribus, result in a positive (negative) change in stock prices.

After the net income description we move to free cash flow explanation. Free cash flow is a cornerstone of discounted cash flow models but such models are used for prediction of future development. Cash flow is the total amount of money which changed during some period. It is difference between amount of money at the end of a period minus amount of money in the beginning of a period. Basically, the only,

[4] Although, this equation migh be more complex.

but important difference between net income and cash flow is that net income captures both earned and relizable or realized revenues and expenses associated with them but cash flow captures the real money inflow (outflow). Subramanyam (2014) says that there are more definitions of accruals but the one mostly used is:

$$Accruals = Net\ Income - Operating\ Cash\ Flow$$

The accrual formula shows us that there is very tight connection between net income and cash flow.

There has been a question which measure, free cash flow or earnings, is better in terms of value prediction. Unlike the free cash flow, earnings better capture the underlying economic activity and are more relevant (Zacks *et al.*, 2011). On the other hand accruals are easier to manipulate (This is called earnings management) than free cash flow. This means that free cash flow is more reliable. Accruals are more the matter of judgement as opposed to free cash flow (Zacks *et al.*, 2011).

We already know about the connection between net income (earnings), cash flow, dividends and capital gain. To sum up, dividends and capital gain move stock prices. We can see that cash flow and earnings are pretty much interchangeable expressed as total cumulative value in the long term period. They differ in accruals in the short term period. We have shown that there is very close connection between net income and stock returns caused either by growth in assets or paing out dividends. Thus, we suggest that earnings and possibly cash flows might drive the changes in stock returns. We continue with empirical research in another section.

It is worth noting that stock split also influences stock prices. Stock split is the division of current stocks to more stocks. This split is described by a stock split ratio where the first number tells us how many new pieces of stock will be created and the second number tells us how many pieces of old stock will be used for the new ones. Subramanyam (2014) says that even though there is no value for shareholders in stock split according to theory, interpretation of stock split is still perceived positively. He says that a lower price arising from the split leads to the effect that it is accessible to broader range of investors because of the lower price. He also claims that stock split means that company management expects that they either

improved or at least preserved the same development in firm's performance. We do not worry about this problem in the thesis because we use only one variable which could be highly influenced by this phenomenon and it is stock price. However, we use stock prices adjusted for stock splits to avoid dealing with the problem ourselves. This adjustment is normaly done by the companies providing financial data such as finance.yahoo and Thomson Reuters.

2.5 Equity market anomalies, Accruals

We have pointed out earlier that the income valuation approach using discounted free cash flow is used to value assets. This kind of estimation is useful when we calculate infinite free cash flow. In the infinity, there are all accruals paid out and therefore earnings do not have to be considered (Beisland, 2009).

We are more curious about short term fluctuations of stock returns in this thesis. Earnings might be a better predictor in that situation.

Even though there are more firm characteristics thought to be predictors of the future returns, earnings are commonly accepted as the strongest predictor of future stock returns (Zacks *et al.*, 2011).

We use earnings, free cash flow and accruals as predictors for changes in stock returns in short term period[5] in this thesis.

We think that there is not an overal synthesis about the conceptual theory building foundations for the stock return developments and its causes. Beaver (2002) reviews perspectives on recent capital market research in his paper. He reviews market research which has had been the most important in terms of accounting. He divides the theory into five research areas. These areas are market efficiency, Feltham-Ohlson modelling, value relevance, analysts' behavior, and discretionary behaviour. Our examination falls mainly into value relevance and discretionary

[5] Cca from one month to three years

behaviour in this concept. Beisland (2009) reviews value relevant literature. He points out interconnection between earnings, free cash flow and accruals and its importance for stock return developments. Zacks *et al.* (2011) on the other hand integrates examination of value relevance to the big group called equity market anomalies in his textbook. He does not really call the concept "value relevance" but he talks about accruals and earnings influence on equity returns in particular chapters called Accruals and Post Earnings Announcement Drift. Even though these studies and textbook do not use same name of concepts and structure, they postulate same problems.

We start with an introduction of post earnings announcement drift. It is phenomenon or field topic which corresponds to the power of earnings to explain future stock returns. That has been examined and confirmed many times. Earnings surprises move stock returns in the same directions after the announcement of earnings by companies. This relationship holds even several months after the announcement. Although, more accounting or other variables [6] are considered to influence stock returns, earnings are commonly supported as the strongest indicator (Zacks *et al.*, 2011).

One study is considered to be the inception of all this research. It is paper published by Brown and Ball (1968). They found that there was a positive relationship between the increase (decrease) in earnings and increase (decrease) in stock prices during the year. They discovered that this relationship has preserved even after three moths after the earnings announcement.

Ever since, many studies examined this relationship and showed that this relationship is valid (Francis *et al.*, 2007; Sadko, 2006; Abarbanell and Bernard 1992; Lerman *et al.*, 2008). It is important to say that size of the drift changes among research but the effect is always present.

Earlier was PEAD examined using the difference between currently announced earnings minus last year announced earnings as proxy for earnings surprise. This is also called as seasonal random walk from of earnings. Later on with the development of databases gathering analyst forecasts such as I/B/E/S, forecast

[6] Such as firm size, proportion of debt, management quality

error as proxy for earnings surprise started to be used. Forecast analyst error is computed as announced earnings relative to the earnings estimate from analysts (Zacks *et al.*, 2011). Livnat and Mendenhall (2006) compared the power of drift between earnings surprise for forecast analyst error and seasonal random walk. They found out that the drift is bigger for forecast analyst error.

Accruals are the cornerstone for financial statements and accounting and closely relate to the earnings and cash flow as stated earlier. Accrual basis does have pros but it possesses also cons. Accruals are often misstated because they come from judgement. There are cases where management manipulate earnings to create more favourable situation. The exact definition for earnings management from Healey and Wahlen (1999, p. 368) is as follows:

> „Earnings management occurs when managers use judgement 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 numbers."

We have three accounting items: earnings, operating free cash flow and accruals. Even though earnings should better reflect the reality of firm profitability it can be influenced by the judgement from management. On the other hand cash flow is more reliable number but less relevant.

Cash flow has some benefits as a measure of firm success when compared with earnings. However, does operating cash flow have a greater influence on stock returns than earnings? Subramanyam *et al.* (2007) and Dechow (1994) examine that there is stronger relationship between earnings and stock returns than between realised cash flow and stock returns. Dechow (1994) also shows that earnings easier reflect sudden changes in firm's economic situation. Biddle, Seow and Siegel (1995) and Francis, Schipper and Vincent (2003) run study researching informational content of net sales, net income and cash flow with respect to stock returns. They discovered that net income has higher information content than net sales and that net sales have higher information content than cash flow. All three variables provide information content which is at least partlially unique for stock returns. Givoly, Hayn

and Lehavy (2009) observe that earnings predictions are more informative than cash flow predictions. Call *et al.* (2009) discover that cash flow predictions enhance earnings predictions. Call, Chen and Tong (2012) examine that cash flow forecasts do provide information by themselves and they are not just simple supplement to earnings forecasts.

Sloan (1996) was one of the first researching accruals and its role in explanation of stock returns. He thought that accruals would have lower information quality than operating cash flow. He showed that there is negative relationship between portion of accruals and future stock abnormal returns and other way around. It is worth noting that Sloan used narrower accruals definition. His paper definition of accruals is change in net operating assets. Ever since there has been research many research about this relationship and other deeper research into accruals (Zacks *et al.*, 2011). Zacks *et al.* (2011) introduces five areas worth for deeper view with respect to accruals.

The first area researches if financial intermediaries such as institutional investors take into an account that the relative magnitude of accruals do influence abnormal stock returns. Bradshaw, Richardson, and Sloan (2001) find that sell-side analysts do not consider the relative importance of accruals but they do care about the total number of earnings. They also found out no difference in auditor's qualified opinion with and without high accruals. Lev and Nassim (2006) examined that some instituational investors use the strategy of the accruals in their trading but it is a relatively low number of investors. Ali, Chen, Yao, and Yu (2008) observe that some mutual funds use this strategy either.

The second area examines if the accrual anomaly exists also when there is a broader definition of accruals. Richardson, Sloan, Soliman, and Tuna (2005) define accruals as change in net current assets plus change in net non-current assets plus change in financial assets. They also use the Sloan's narrower definition for comparison. They observe that the broader definition comes with stronger returns when establishing a hedge portfolio.

The third area studies the situations where accrual anomaly might be stronger with respect to the balance sheet. Thomas and Zhang (2002) and Chan, Jegadeesh,

and Lakonishok (2006) find that the accrual anomaly is mainly caused by inventory. Chan, Chan, Jegadeesh, and Lakonishok (2006) observe that the accrual anomaly is generally stronger for firms with higher proportion of working capital.

The fourth area researches events which happen after announcing high accruals. Allen *et al.* (2010) investigates what happens with firms having big inventory growths. They find that these companies tend to have high write-downs in subsequent years. Chan, Chan, Jegadeesh, and Lakonishok (2006) reveal that companies with high accruals probably reports negative special items in the next three years. Firms accused from manipulation of earnings have large accruals. Receivables and inventories are the items to be the most manipulated (Richardson, Sloan, Soliman, and Tuna 2006; Dechow, Ge, Larson, and Sloan 2011). Dechow and Ge (2006) finds out that firms with low accruals and high special items tend to have higher returns than firms with just low accruals. They state that this is probably because analysts overstate bad news.

The fifth area examines accrual anomaly around the world. According to Leippold and Lohre (2010) and Pincus *et al.* (2007) the anomaly appears in most of the countries but it is stronger in common law states than in civil law ones. It appears that the anomaly is bigger in the countries where are higher reactions to earnings new and in the countries where cash flows are more persistent than accruals.

Healy and Wahlen (1999) closer review earnings management as the cause of big accruals. They try to summarize the literature to help accounting setters and regulators to solve the question how much of judgement should be allowed for the management with respect to financial accounting. We have already stated that companies accused from manipulation of earnings tend to have very high accruals (Richardson, Sloan, Soliman, and Tuna 2006; Dechow, Ge, Larson, and Sloan 2011).

Even though Nissim (2006) states that accrual anomaly is still persistent some papers claim that this persistence might mitigate in the recent history. Green *et al.* (2010) finds that the accrual anomly started to evaporate in 2000. They conclude that this is caused at least partially by arbitraging the opportunity by some big hedge funds. It seems probable because some of the researches who have made research in accrual anomaly were employed by hedge funds later on (Green *et al.*, 2010).

Radhakrishnan and Wu (2014) and Mohanram (2014) observe that the accrual anomaly is significantly smaller in 1991-2001 than in 2002-2010. Mohanram (2014) examined that this is probably because of analyst's cash flow forecasts. Analysts cash flow forecast were not usual until 2001. In that time, less than 10 % of firms in I/B/E/S had forescasts for cash flow. From 2002 the number of cash flow forecasts increased dramatically and in 2010 nearly half of the companies had already the cash flow forecasts on I/B/E/S. Mohamaran (2014) states:" The negative relationship between accruals and future returns is significantly weaker in the presence of cash flow forecasts". It is consistent with the fact that is postulated by Zacks (2011, p.63): "Information is a critical element of a well-functioning market. Accumulating information allows an individual to make a better decision and potentially trade a certain asset at a more favorable price. Therefore, investors spend considerable amounts of money to buy analysis from information intermediaries such as security analysts" (Zacks *et al.*, 2011, p.63). It is also consistent with the fact that if analysts predict earnings and cash flow in the same time, they actually forecast accruals as well. It is worth noting that Bhojraj, Sengupta and Zhang (2009) say that the weakening accrual anomaly is also caused by implementing new regulations which enhance the earnings quality that mitigates accrual anomaly. They document Sarbanes-Oxley Act of 2002 and SFAS No. 146 as examples. They say that these regulations enhance quality of earnings and alleviate earnings management.

To sum up, there has been found that accrual anomaly might started to mitigate in the recent history (Green *et al.*, 2010; Radhakrishnan and Wu 2014; Mohanram 2014). This is a big deal because accrual anomaly is one of the biggest discovered anomalies happening in the equity market and it was the most robust anomaly observed at the time of detection (Zacks *et al.*, 2011). We think that this deserves additional examination of this phenomenon. We decide to examine if accrual anomaly persist. We decide to collect contemporary data for the examination.

3 Data and Methodology

3.1 Data

We have gathered data from the well known financial database called ThomsonReuters owned by the Thomson Reuters Corporation. We gathered 784 companies and their annual and montly data from 1989 to the present. These firms are from NASDAQ and NYSE with headquarters in United States. We exclude financial institutions from our dataset because it is hard to distinguish if the activity is operating or non operating in these companies. We have included only companies which already existed in 1989. We want to avoid comanies IPO's because of big unexpected changes in accruals. Teoh, Wong and Rao (1998) found out that companies going through IPO have significantly higher unexpected accruals and this trend was present for other subsequent years in their research. We also exclude companies delisted in this period to avoid firms managing their earnings (accruals) consistent with the finding that firms under the financial distress manage their earnings more frequently (Charitou *et al.*, 2011). Even though we gathered many data, some important items such as market capitalization, retined earnings, amount of receivables etc. missing. Thus, we adjust dataset with respect to missing observations. We use different amount of observations in different models because every particular model demands different amount of variables. Most of the time adding new variable to the model means decrease in observations because variables do not have the same amount of data as these variables already included in the model. These missing data differs most of the time based on the specific variable. We have to point out that it is hard to find out why some specific data absent. Thomson Reuters denotes these unavailable data with "NULL" but does not explain any cause for that. From the original number counting to more than twenty thousand observations for one variable we end up with less than five thousand observations for a variable in a specific statistical model at the best (every model has the information

about number of observations used included). For the computation of abnormal returns, we have to collect monthly stock prices therefore 258 693 observations was collected in the beginning. We downloaded 27 632 observations for every firm specific balance sheet, income and cash flow statement variables[7].

Analyst forecasts are collected from I/B/E/S[8] database which is part of the Thomson Reuters database. I/B/E/S is widely used and represents database of forecasts gathered from the huge amount of analysts[11] (Mohanram, 2014). Analysts forecasts made by analysts from brokerage houses perform better than other forecasts made from other analysts more connected with stock buys (Barber *et al.*, 2006). This is good finding because I/B/E/S database gathers equity forecasts from stock broker analysts[9].

Stock prices provided by stock exchanges are not ready to be used as benchmark for our estimation because the influence of stock splits and dividend issuances is present as stated earlier. Stock splits and dividend issuances have impact on stock prices but they are not incorporated in the price therefore we need to handle this problem. In the research, we use the stock price noted as "Close price" as a reference stock price for our computations and estimations. The reason is that the "Close price" is a stock price which is adjusted for all splits and dividend issuances recorded through the examined period. These rules adhere to the Center for Research in Security Prices standards. Applied split multipliers follow the split ratio and dividend multipliers follow the rule that a dividend is computed as a percentage of net income and then extracted from the last known original stock price. For example, when every stock is split into two company stocks, then the stock price is multiplied by two. When a company issues \$0.10 dividend and the firm closing price is \$25, adjusted price for dividend is equal to $=> [\left(1 - \frac{0.1}{25}\right) * pre - dividend\ price]$[10]. We use this pre-calculated "Close price" because it is needed to have the stock price already adjusted for any other influences which could have an impact on estimation.

[7] Also, including "NULL"
[8] https://financial.thomsonreuters.com/en/products/data-analytics/company-data/ibes-estimates.html

3.2 Methodology

The aim of the thesis is to examine if the accrual anomaly really is growing smaller in magnitude nowadays as suggested by Green *et al.* (2010), Mohanram (2014) Radhakrishnan and Wu (2014) and Bhojraj, Sengupta and Zhang (2009). We test for three possible causes of this alleviation. We examine this with respect to three variables which could mitigate the anomaly. These variables are earnings quality, institutional investment in accruals based strategies and presence of cash flow forecasts (Green *et al.*, 2010; Mohanram 2014; Bhojraj, Sengupta and Zhang 2009).

We use the broader definition of accruals in this thesis as well as Richardson, Sloan, Soliman and Tuna (2005) and Mohamaran (2014). This definition is consistent with the most used accrual definition (Subramanyam, 2014). We then decompose our defined accruals as suggested by Dechow, Richardson and Sloan (2008) to show other possible relationships and to have closer look what happens to individual items. The following variables are consistent with the variables used by Dechow, Richardson and Sloan (2008) and Mohamaran (2014) in their research.

TACC = Aggregate measure of total accruals

ΔNOA= Change in net operating assets

ΔFIN = Change in net financial assets

ΔNCO = Change in net non current operating assets

ΔWC = Change in net working capital

Unlike the Richardson *et al.* (2005) and Mohamaran (2014) who use Compustat, we gather balance sheet, income and cash flow statement data from ThomsonReuters database. Both databases use different standardisations for the balance sheet, income statement and other items. On the other hand, the basic concept behind is the same therefore we transform the data from ThomsonReuters to the same form as Mohanmaran (2014) and Richardson *et al.* (2005).

WC = Net working capital

WC = COA – COL

COA = Current operating assets

COL = Current operating liabilities

COA = Total current assets minus cash and short-term investments

COL … Total current liabilities minus notes payable/short-term debt minus current portion of LT debt/capital leases

NCO = Net non current operating assets

NCO = NCOA - NCOL

NCOA = Non current operating assets

NCOA = Total assets minus total current assets minus long-term investments

NCOL = Non current operating liabilities

NCOL = total liabilities minus total current liabilities minus total long term debt

FIN = Net financial assets

FIN = FINA - FINL

FINA = Short-term investments plus long-term investments

FINL = Financial liabilities

FINL = Total long term debt plus notes payable/short-term debt plus current portion of LT debt/capital leases plus preffered stock.

At the end, we present the most important formulas for our research showing the accrual decomposition into change in net operating assets and change in net financial assets where change in net operating assets is equal to change in net non current assets plus change in net working capital.

$$\mathrm{TACC} = \Delta\mathrm{NOA} + \Delta\mathrm{FIN}$$

$$\Delta\mathrm{NOA} = \Delta\mathrm{NCO} + \Delta\mathrm{WC}$$

We normalize all the variables named before by average assets (AT). It is so, because the normalization creates it possible to compare these variables among all firms (Sloan, 1996).

$$\text{Normalization process} = \frac{Followed\ variable\ in\ time\ t\ \ for\ a\ specific\ company}{Total\ assets\ of\ a\ company\ at\ time}$$

We use operating income divided by total assets (ROA) consistent with Richardson *et al.* (2005) and Mohanmaran (2014). We normalize the earnings variable by total assets as well. Of course, we incorporate abnormal future returns (OSAR). We download stock prices ("at the close") from Thomson Reuters which are adjusted for both dividends and stock splits to be used for computation of abnormal returns. Abnormal return is calculated using two measures consistent with Mohanram (2014). The first measure is normal stock return for the company calculated as difference between stock prices where the first stock price is measured four months after fiscal year[11] end and the second stock price is measured twelve months later. The second measure is stock return calculated from size and book to market value portfolios dividing companies to 25 groups. Size is expressed as the market value of the company and book to market is book value of equity divided by matket value of a firm. Every company is assigned to one group (portfolio) out of 25. The second measure is then calculated as one year return starting four months after fiscal year end period and ending twelve months later. Portfolios are possible to download at French's data library[12]. Overall stock abnormal return (OSAR) is calculated as difference between two previously mentioned measures of stock returns:

$$OSAR = company's\ actual\ stock\ return - portfolio\ stock\ return$$

[11] This is common way to calculate returns because file Form 10-K's is usually issued within additional four months (Alford *et al.,* 1994) .

[12] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

In the first section of empirical research, we describe the data using basic descriptive statistics. Then, we measure Spearman's correlations and its specific p-values. We perfrom the basic statistic descriptions and correlations with the usage of following variables:

$$\mathrm{OSAR}_{t+1}, \mathrm{ROA}_t, \Delta\mathrm{WC}_t, \Delta\mathrm{NOA}_t, \Delta\mathrm{NCO}_t, \Delta\mathrm{FIN}_t$$

where t stands for time period when is specific fimr's variable measured. We also present basic data descriptions for our data divided as if the companies have cash flow forecast or not. We compare medians and means for all these chosen variables.

The second section shows if there exists some first evidence for the accrual anomaly weakening. We calculate quintile hedge returns using $\Delta\mathrm{NOA}$ to see how the hedge returns change trough the time[13]. We perfrom it for every year form the sample separately. Then, we do the same for $\Delta\mathrm{NOA}$ with division to two groups. One group includes only firms with cash flow forecasts and the second group incorporates only companies without cash flow forecasts. We expect that if the accrual anomaly alleviate because of earnings, hedge returns of $\Delta\mathrm{NOA}$ for firms with cash flow forecasts should be smaller than hedge returns of $\Delta\mathrm{NOA}$ for firms without cash flow forecasts. Hedge return is calculated as the hold (buy) return from holding the median of the lowest quintile for some variable minus sell (short) return from holding the median of the highest quintile fo the variable. The variable is sorted out based on some specific criteria. For instance, it is sorted out from the lowest value of change in net operating assets to the highest value of change in net operating assets. Then, the quintiles are created from this alignment. We have to point out that hedge returns are usually calculated using mean values. We decide to use median values because when we computed the hedge returns with the usage of average values, the hedge returns were very susceptible to outliers.

$$\text{Hedge return} = \text{median value of lower quantile} - \text{median value of upper quintile}$$

[13] We consider this focusing on the presence of cash flow forecasts.

The third section presents computation of robust regressions examining the development of accrual anomaly over time. We examine if the accrual anomaly is really getting weaker. We employ MM robust regression instead of simple regression to avoid the influence of outliers consistent with Mohanram (2014).

We firstly run general equations to confirm accrual anomaly and then we use dummy variable to distinguish between earlier time period where accrual anomaly should be stronger and later period when accrual anomaly should be weaker. Formulas are defined as follows:

$$OSAR_{i,t+1} = \alpha_0 + \beta_1 * ROA_{i,t} + \beta_2 * \Delta NOA_{i,t} + \beta_3 * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

$$OSAR_{i,t+1} = \delta_0 + \gamma_1 * ROA_{i,t} + \gamma_2 * \Delta WC_{i,t} + \gamma_3 * \Delta NCO_{i,t} + \gamma_4 * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

$\alpha_0, \alpha_1, \delta_0, \delta_1$ = Intercepts

$\beta_1, \beta_2, \beta_3, \gamma_1, \gamma_2, \gamma_3, \gamma_4$ = Coefficients to be estimated

We assume coefficients $\beta_2, \beta_3, \gamma_2, \gamma_3, \gamma_4$ to be significantly negative if the accrual nomaly is present.

$$OSAR_{i,t+1} = \alpha_0 + \beta_1 * ROA_{i,t} + \beta_2 * \Delta NOA_{i,t} + \beta_3 * \Delta FIN_{i,t} + \alpha_1 * SOX_{i,t} + \beta_4 * SOX_{i,t} * ROA_{i,t} + \beta_5 * SOX_{i,t} * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

$$OSAR_{i,t+1} = \delta_0 + \gamma_1 * ROA_{i,t} + \gamma_2 * \Delta WC_{i,t} + \gamma_3 * \Delta NCO_{i,t} + \gamma_4 * \Delta FIN_{i,t} + \delta_1 * SOX_{i,t} + \gamma_5 * SOX_{i,t} * \Delta WC_{i,t} + \gamma_6 * SOX_{i,t} * \Delta NCO_{i,t} + \gamma_7 * SOX_{i,t} * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

$\alpha_0, \alpha_1, \delta_0, \delta_1$ = Intercepts

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_6, \gamma_7$ = Coefficients to be estimated

SOX = Dummy variable, one when year is equal to 2002 and later and zero otherwise

If the anomaly decreased over time than we assume coefficients $\beta_4, \beta_5, \gamma_6, \gamma_7, \gamma_8$ to be significantly positive and coefficients $\beta_2, \beta_3, \gamma_2, \gamma_3, \gamma_4$ to be still significantly negative.

The fourth section introduces Heckman first stage estimation. Heckman two stage estimation tries to deal with sample selection bias using two step estimation approach (Heckman, 1979). In this section we research which variables influence the chance that a firm would be chosen to have the cash flow forecast. We use this technique because companies with cash flow forecasts migh have been chosen non-randomly and could cause bias in the later estimates (Mohanram, 2014). DeFond and Hung (2003) and Call (2008) observe that companies with cash flow estimates have higher market capitalization, have higher absolute accruals, are more capital intensive, have higher volatile earnings and are more probable to be in financial difficulties. We control for the selection bias estimating probit model using cash flow dummy variable and proxies for market capitalization, absolute accruals, capital intensity, volatility of earnings and probability of going to bankruptcy. We calculate the inverse mill's ratio with usage of the probit and then in the second stage we include it to the regression to control for the selection bias. The formula for probit is defined in a following way:

$$Pr(CFD = 1)_{i,t} = \alpha_0 + \beta_1 * VOL_{i,t} + \beta_2 * CAPINT_{i,t} + \beta_3 * ABSACC_{i,t} + \beta_4 * LMCAP_{i,t} + \beta_5 * Z_{i,t}$$

where:

α_0 = An intercept to be estimated

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Regression coefficients to be estimated

VOL = A proxy for volatility of earnings

$CAPINT$ = Capital intensity

$ABSACC$ = The absolute value of total accruals

$LMCAP$ = Log of market capitalization

Z = Altman's Z score representing the likelihood of bankruptcy

We compute all these proxies using data from ThomsonReuters for one firm in one period. We define independent variables as follows:

VOL = Coefficient of variation of net income scaled by total assets then divided by coefficient of variation o fcash flow deflated by total assets.

CAPINT = Gross property, plant and equipment scaled by total assets

ABSACC = TACC deflated by total assets

LMCAP = Natural logarithm of market capitalization

Altman's Z score = 1.4 * retained earnings / total assets + 1.2 * working capital / total assets + 3.3 * EBIT / total assets + 1 * sales / total assets + 0.6 market capitalization / total liabilities

We compute Altman's Z score according to Altman (2011) and consistent with Mohamaran (2014).

The fifth section goes deeper into the accrual anomaly and tests whether the presence of analyst cash flow forecasts really are leading to reductions in the the accrual anomaly size. We employ a dummy variable called CFD that is equal to one when there is cash flow forecast for a firm in a specific year and zero otherwise. Unlike the model from the third part, we can better control for the cash flow forecast occurrence impact.

$$OSAR_{i,t+1} = \alpha_0 + \beta_1 * ROA_{i,t} + \beta_2 * \Delta NOA_{i,t} + \beta_3 * \Delta FIN_{i,t} + \alpha_1 * CFD_{i,t} + \beta_4 * CFD_{i,t} * NOA_{i,t} + \beta_5 * CFD_{i,t} * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

$$OSAR_{i,t+1} = \delta_0 + \gamma_1 * ROA_{i,t} + \gamma_2 * \Delta WC_{i,t} + \gamma_3 * \Delta NCO_{i,t} + \gamma_4 * \Delta FIN_{i,t} + \delta_1 * CFD_{i,t} + \gamma_5 * CFD_{i,t} * \Delta WC_{i,t} + \gamma_6 * CFD_{i,t} * NCO_{i,t} + \gamma_7 * CFD_{i,t} * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

If cash flow analyst forecasts mitigate acrrual anomaly, then coefficients $\beta_4, \beta_5, \gamma_5, \gamma_6, \gamma_7$ should be significantly positive. It is because these coefficients should decrease the magnitude of accrual anomaly coefficients ($\beta_2, \beta_3, \gamma_2, \gamma_3, \gamma_4$).

We employ the dummy variable for cash flow forecast for observations (firms) which have at least one analyst following in the fiscal year.

We estimate the same equations in another two models. These models differ by the number of observations. We use subset of the original sample. We employ only observations which have at least one analyst following. This requirement is used because we expect that the observations within the subsample should be more similar to each other. We estimate another two models coming from the same equation but with addition of the inverse mill's ratio (IM) as consistent with Heckman to control for selection bias. Models controlling for the sample selection bias look in a following way: T

$$OSAR_{i,t+1} = \alpha_0 + \beta_1 * ROA_{i,t} + \beta_2 * \Delta NOA_{i,t} + \beta_3 * \Delta FIN_{i,t} + \alpha_1 * CFD_{i,t} + \beta_4 * CFD_{i,t} * NOA_{i,t} + \beta_5 * CFD_{i,t} * \Delta FIN_{i,t} + \beta_6 * IM_{i,t} + \varepsilon_{i,t}$$

$$OSAR_{i,t+1} = \delta_0 + \gamma_1 * ROA_{i,t} + \gamma_2 * \Delta WC_{i,t} + \gamma_3 * \Delta NCO_{i,t} + \gamma_4 * \Delta FIN_{i,t} + \delta_1 * CFD_{i,t} + \gamma_5 * CFD_{i,t} * \Delta WC_{i,t} + \gamma_6 * CFD_{i,t} * NCO_{i,t} + \gamma_7 * CFD_{i,t} * \Delta FIN_{i,t} + \gamma_8 * IM_{i,t} + \varepsilon_{i,t}$$

We expect that coefficients $\beta_2, \beta_3, \beta_4, \beta_5, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_6, \gamma_7$ behave the same as explained before in this section.

The sixth section looks into other factors which could mitigate accrual anomaly. We know that institutional investors use the accrual strategy in their trading Lev and Nassim (2006). On the other hand, later research from Green *et al.* (2010) propose that the greater number of academics familiar with accrual anomaly lead to stratégy that funds do trade on this anomaly. We think that the improvement in laws and accounting standards might decrease the accrual anomaly as well. Sengupta and Zhang (2009) suggest that earnings quality decrease the effect of accrual anomaly. They propose that the implementation of SFAS No. 146 and Sarbanes Oxley Bill increased the quality of accruals therefore increased the quality of earnings.

We define a proxy variable for the quality of earnings consistently with Dechow and Dichew (2002) in the following way:

1. We regress operating cash flow from the current year, the next year and the previous year on change in net working capital for every year separately (all the variables scaled by total assets). Then, we save the residuals for every company for every separate year
2. We compute the earnings quality for every firm as variance from the five lagged residuals of a company (named EQ)

$$OSAR_{i,t+1} = \alpha_0 + \beta_1 * ROA_{i,t} + \beta_2 * \Delta NOA_{i,t} + \beta_3 * \Delta FIN_{i,t} + \alpha_1 * EQ_{i,t} + \beta_4 * EQ_{i,t} * NOA_{i,t} + \beta_5 * EQ_{i,t} * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

We construct a proxy for the usage of accrual anomaly strategy by institutional funds as number of assets ruled by hedge funds consistent with Green *et al.* (2010). We define the proxy as follows:

IF = ln (number of assets managed by hedge funds at time t)

$$OSAR_{i,t+1} = \alpha_0 + \beta_1 * ROA_{i,t} + \beta_2 * \Delta NOA_{i,t} + \beta_3 * \Delta FIN_{i,t} + \alpha_1 * IF_t + \beta_4 * IF_t * NOA_{i,t} + \beta_5 * IF_t * \Delta FIN_{i,t} + \varepsilon_{i,t}$$

We compute the same two equations with usage of EQ and IF for subsample from 2011 to 2015 to discover if the relationships really do or do not hold nowadays.

4 Estimation

4.1 Descriptive statistics

We have to point out that all numbers are always rounded to the smallest decimal place in the thesis. In the beginning, we perform simple descriptive statistics. We perform it on our sample from 1991 to 2015. We can see that one year ahead abnormal stock returns ($SOAR_{t+1}$) were on average equal to 3.5 %. Unlike the other variables $SOAR_{t+1}$ had relatively high standard deviation (67.5 %). It is interesting that $SOAR_{t+1}$ had positive mean but negative median value (-2.3 %). It is worth noting that we also calculated the mininimum and maximum value of $SOAR_{t+1}$. Maximum is equal to 2 969 % and minimum -130 %. We can see that these values are quite far from the median and mean value. Thus, it looks that the robust regression approach used by Mohanram (2014) is reasonable because of the outliers. We have to point out that other outliers were discovered during the data procession which is another evidence for the usage of robust regression.

It is interesting that all the accrual variables have negative mean value with exception of ΔNCO_t. It means that accruals on average decrease in the following period. We cannot forget that these values are scaled by the amount of the total assets which means that accruals might increase in absolute values in this period. We can also see from the table [1] that the ΔWC_t has the lowest standard deviation (5.4 %) from all accrual measures. ROA_t was on average equal to 8.2 % and its median was 7.8 %.

Table 1: Descriptive statistics

Variable (in %)	Mean	Standard Deviation	1th quantile	Median	3rd quantile
$SOAR_{t+1}$	3.5	67.6	-19.6	-2.3	16.5
ΔNOA_t	-0.3	12.3	-4.3	-0.8	3.4
ΔWC_t	-0.2	5.4	-1.8	-0.1	1.5
ΔNCO_t	<0.1	11.7	-3.8	-0.7	2.8
ΔFIN_t	-0.1	10.9	-3.7	0.3	4
ROA_t	8.2	11.2	4.6	7.8	12.5

(N = 4 322)
Source: Own calculations, Thomson Reuters

We have a look at table [2] with correlation matrix to observe the conection between followed variables. Firstly, we observe that Spearman's correlation coefficients in the table are significant at the 95% level of significance except of the correlation coefficient between ΔFIN_t and $SOAR_{t+1}$ which is not significant at 95% level of significance and Spearman's correlation coefficient between $SOAR_{t+1}$ and ROA_t not significant at 95% level of significance as well. Thus, we do not reject the null hypothesis that the correlation coefficient is equal to zero for ΔFIN_t and $SOAR_{t+1}$.

All the correlation coefficients between accrual variables and $SOAR_{t+1}$ are negative and statisticaly significant at 95% level of significance (with exception of ΔFIN_t which is not significant). It is consistent with accrual anomaly that the higher are the accruals the lower abnormal returns are earned in the next period. It is worth noting that the ΔNOA_t is mainly driven by the ΔNCO_t because of the high correlation coefficient (0.83). On the other hand, the correlation coefficient between ΔNOA_t and ΔWC_t is smaller (0.36). We can also observe that the correlation coefficient between ΔFIN_t and the rest of accrual variables is always negative (-0.28, -0.14, -0.30).

Table 2: Correlation matrix- Spearman's coefficients (above), p-values (below)

	$SOAR_{t+1}$	ΔWC_t	ΔNCO_t	ΔNOA_t	ΔFIN_t	ROA_t
$SOAR_{t+1}$		-0.04	-0.04	-0.05	<-0.01	-0.01
ΔWC_t	0.02		-0.09	0.36	-0.28	0.04
ΔNCO_t	0.02	<0.01		0.83	-0.14	0.11
ΔNOA_t	<0.01	<0.01	<0.01		-0.30	0.11
ΔFIN_t	0.81	<0.01	<0.01	<0.01		0.11
ROA_t	0.60	<0.01	<0.01	<0.01	<0.01	

(N = 4 322)
Source: Own calculations, Thomson Reuters

Table [3] shows us the mean and median values for the followed variables dividing them to two groups. The first group shows mean and median values for companies with cash flow forecasts (CFF = 1) and the second group presents mean and median values for the firms without cash flow forecasts (CFF = 0). We can see that $SOAR_{t+1}$ mean is higher (5.9 %) for the firms without cash flow forecasts than mean for the companies with cash flow forecasts (0.5 %). On the other hand, median is lower for firms without cash flow forecasts (-3.7 %) than for companies with cash flow forecasts (-1.2 %). Most of the means and median values for the accrual variables are slightly negative. We can see that the highest absolute difference between mean of accrual variables for the companies with and without cash flow forecasts is in ΔFIN_t (0.4 %). The highest absolute difference between median of accrual variables for the companies with and without cash flow forecasts is in ΔFIN_t and ΔNCO_t (0.2 %).

Table 3: Descriptive statistic- comparison between companies with and without cash flow forecasts

Variable (in %)	Mean (CFF = 0)	Mean (CFF = 1)	|Diff-erence|	Median (CFF = 0)	Median (CFF = 1)	|Difference|
ROA_t	7.9	8.5	0.6	7.9	7.8	0.1
ΔNOA_t	-0.4	-0.1	0.3	-1.0	-0.6	0.4
ΔWC_t	-0.3	-0.2	0.1	-0.2	-0.1	0.1
ΔNCO_t	-0.2	0.1	0.3	-0.7	-0.5	0.2
ΔFIN_t	0.1	-0.3	0.4	0.4	0.2	0.2
$SOAR_{t+1}$	5.9	0.5	5.4	-3.7	-1.2	2.5

(N = 1923 for CFF=1; N = 2 399 for CFF=0)
Source: Own calculations, Thomson Reuters

4.2 Accrual anomaly and hedge returns

We can see in table [4] that the number of our sample observations (N) slightly decline through the time, equal to 183 in 1991 and 146 in 2015. Number of firms which possess cash flow forecasts (N_{CPSE}) in our sample increases through the time until 1999 and then seems to fluctuate around 100-110 observations with exception in 2001. Number of companies with earnings forecasts (N_{EPSE}) seems to be consistent through the time fluctuating between around 120-150 observations. Mohanram (2014) calculates number of companies having cash flow forecasts and earnings forecast from 1991 to 2010 for the whole United States equity market with exception of financial institutions. He presents that there was only one firm with cash flow forecast in 1991. The amount of companies with cash flow forecasts then increased gradually until 2000 (414 cash flow forecasts). Then, there was a decline to 242 in 2001. Number of cash flow forecasts started to gradually grow in 2002 (956 forecasts) up to 1516 forecasts in 2010. He also shows that there was 1595 companies with earnings forecasts in 1991 and this number most of the time grew until 2010 (2577 earnings forecasts).

We define hedge returns sorted out based on the change in net operating assets ($HRET_{\Delta NOA}$). We employ the variable to examine the average value through the time. We expect the average value of ($HRET_{\Delta NOA}$) between 1991 and 2001 to be higher than between 2002 and 2015 which would be in accordance with the suggestion that there was proportionally less firms with cash flow forecasts between 1991 and 2001 and that the Sarbanes-Oxley bill (SOX) was entered into force in 2002. It is consistent with the mitigation of accrual anomaly explained in previous sections. Average value of hedge returns ($HRET_{\Delta NOA}$) between 1991 and 2001 is equal to 5.3 % and average value of the hedge returns ($HRET_{\Delta NOA}$) between 2002 and 2015 is equal to 5 %. Earlier period has greater average hedge return but only by 0.3 percentage points. We think that this result suggest that there might not be accrual anomaly mitigation present in the recent past.

Table 4: Descriptive statistics

YEAR	N	N_{CPSE}	N_{EPSE}	$HRET_{\Delta NOA}$
1991	183	0	139	-0.8 %
1992	182	0	137	14.6 %
1993	186	8	142	11.3 %
1994	190	29	143	2.3 %
1995	163	27	130	-8.6 %
1996	184	26	151	-11.7 %
1997	175	25	143	12.6 %
1998	176	92	146	19.4 %
1999	181	104	145	-2.2 %
2000	167	95	138	29.1 %
2001	166	49	135	-6.2 %
2002	164	85	135	4.3 %
2003	155	100	133	-4.2 %
2004	147	93	122	12.5 %
2005	142	91	124	20.9 %
2006	150	96	126	-4.8 %
2007	158	107	142	7.1 %
2008	164	106	141	10.0 %
2009	163	103	141	-3.8 %
2010	160	113	138	8.3 %
2011	167	123	152	1.8 %
2012	164	118	148	19.5 %
2013	148	108	134	-6.3 %
2014	146	114	136	1.6 %
2015	146	111	136	5.4 %
Mean 1991-2001				5.4 %
Mean 2002-2015				5 %

Source: Own calculations, Thomson Reuters

We observe the hedge returns ($HRET_{\Delta NOA\ CF}$ and $HRET_{\Delta NOA\ No\ CF}$) to be sorted out according to the magnitude of ΔNOA (table [5]). Our dataset includes big amount of cash flow forecast firms proportionally with respect to the overall amount of observations. In spite of that, we do not have big amount of observations with cash

flow forecasts until 1998 therefore we exclude observations from 1991 to 1997[14]. We expect that hedge returns for the firms with cash flow forecasts ($HRET_{\Delta NOA\ CF}$) should be lower than hedge returns for firms without cash flow forecasts ($HRET_{\Delta NOA\ No\ CF}$) if the theory of decreasing accrual anomaly based on the presence of cash flow forecasts holds. We can see that average value of $HRET_{\Delta NOA\ CF}$ from 1998 to 2015 is actually lower than average value of $HRET_{\Delta NOA\ No\ CF}$. It is consistent with the previous stated expectation. We have to point out that this is only preliminary evidence. We cannot fully rely on this result because we think that the number of observations for the specific hedge quantiles does not seem to be sufficient.

Table 5: Comparison of change in net operating assets hedge returns

YEAR	N_{CF}	N_{NOCF}	$HRET_{\Delta NOA\ CF}$	$HRET_{\Delta NOA\ No\ CF}$
1998	92	84	6.7 %	33.2 %
1999	104	77	1.4 %	-12.8 %
2000	95	72	-12.4 %	21.8 %
2001	49	117	-6.3 %	-5.2 %
2002	85	79	1.0 %	-5.5 %
2003	100	55	-8.0 %	15.0 %
2004	93	54	5.9 %	40.0 %
2005	91	51	6.9 %	29.8 %
2006	96	54	0.7 %	1.7 %
2007	107	51	-1.6 %	12.6 %
2008	106	58	8.4 %	11.9 %
2009	103	60	1.4 %	1.2 %
2010	113	47	4.3 %	12.6 %
2011	123	44	12.8 %	11.1 %
2012	118	46	15.3 %	30.9 %
2013	108	40	-7.9 %	10.8 %
2014	114	32	5.8 %	-23.5 %
2015	111	35	7.6 %	-23.8
MEAN			2,3	9,0

Source: Own calculations, Thomson Reuters

[14] We have to point out that this statement is rather subjective decision than the statement based on the underlying exact thery.

4.3 Accrual anomaly, robust regression and time

In the beginning, we have to highlight a few things. Firstly, we have to point out that it is problematic to justify if the coefficients from robust regression are significant or not. We use the approach consistent with Mohanram (2014). He compares his t-values from the robust regression with t-critical values from t-table. T-value equals to (-)1.645 corresponds to 90% critical level of confidence interval. T-value equals to (-)1.96 means 95% critical level of confidence interval. T-value equals to (-)2.576 is 99% critical level of confidence interval. We run robust regression based on MM weights as suggested by Leone, Minutti and Wasley (2012). We perform estimation of clustered standard errors (time, firm specific) suggested by Leone, Minutti and Wasley (2012) as well.

We start with an examination of accrual anomaly. We first confirm the presence of accrual anomaly using models [1] and [2] with usage of ΔNOA in the model and $\Delta NCO, \Delta WC$ in the second model. We can see the results in table [6]. The change in net operating assets has negative coefficient which consistent with accrual anomaly. It is also significantly positive at 95% confidence interval[15]. Also, the coefficient of change in net financial assets has negative sign but it is statistically significant only at the 90% level of signifiance. Model [2] decomposes ΔNOA to ΔWC and ΔNCO. We assume coefficients of ΔWC and ΔNCO to be negative and statistically significant. We look at the model [2] and we can actually see that coefficients of these variables are really significant at the 95% level of significance and that they are negative. In the model [2], the ΔFIN coefficient is again negative and statistically significant at the 95% level of significance. Models [3] and [4] examine simple development of accrual anomaly through time using dummy variable approach dividing our period to two periods. We might discover preliminary evidence of mitigation in accrual anomaly likely caused by the Sarbanes-Oxley bill entering into force and increasing presence of cash flow forecasts. The time period change is represented by the dummy variable called SOX. SOX coefficient is

[15] Our inference comes from the assumption that the distribution of the sample is t-distribution (such as Mohanram (2014))

positive and statisticaly significant at the 99% level of significance. This result is in line with the idea of mitigation of accrual anomaly nowadays. On the other hand positive coefficients of (SOX * ΔNOA) and (SOX * ΔFIN) are statisticaly insignificant at 95% level of significance. It is worth noting that coefficient of (SOX * ΔFIN) is significant at 90% level of significance. In the model [4], we again decompose the accruals into ΔNOA and ΔFIN. We collect similar results as before. (SOX * ΔWC), (SOX * ΔNCO) and (SOX * ΔFIN) coefficients are positive but statistically insignificant at 95% level of significance. The SOX coefficient is again statistically significant and positive. Thus, the preliminary evidence shows that the accrual anomaly seems to decrease from 2002 to 2015 but it appears that the increasing amount of cash flow forecasts do not have to be the cause of this development. We exploit it further and more comprehesively later on.

Table 6: Development of the accrual anomaly through time

	Model 1	Model 2	Model 3	Model 4
Intercept	-0.05 (-8.70)	-0.05 (-8.85)	-0.08 (-10.76)	-0.08 (-10.92)
ΔNOA	-0.10 (-2.77)		-0.11 (-2.35)	
ΔWC		-0.26 (-3.05)		-0.31 (-3.00)
ΔNCO		-0.08 (-2.14)		-0.09 (-1.82)
ΔFIN	-0.07 (-1.62)	-0.09 (-2.16)	-0.13 (-2.52)	-0.16 (-3.13)
ROA	0.20 (5.00)	0.21 (5.13)	0.23 (5.81)	0.24 (5.95)
SOX			0.05 (5.62)	0.05 (5.67)
SOX * ΔWC				0.09 (0.50)
SOX * ΔNCO				0.01 (0.13)
SOX * ΔNOA			0.01 (0.18)	
SOX * ΔFIN			0.13 (1.53)	0.14 (1.67)
R-squared	0.013	0.015	0.026	0.029
Number of observations	4 322	4 322	4 322	4 322

Source: Own calculations, Thomson Reuters

4.4 First stage estimation of Heckman's model using probit

We estimate the first stage of the Heckman estimation (table [7]). We expect all the variables to be statistically significant at 95% level of significance. We foresee the volatility (VOL) variable, capital intensity (CAPINT) variable, absolute accruals (ABSACC) variable and natural log of market capitalization (LMCAP) to be significantly positive and Altman's Z score (Z-score) to be significantly negative consistent with DeFond and Hung (2003) and Call (2008). Total amount of observations decrease because we have to employ another variables. We observe that not all the proposed variables are significant at 95% level of significance. VOL, CAPINT and ABSACC are not significant at 95% level of significance. On the other hand, LMCAP and Z-score are significant at 95% level of significance. This would mean that the situation whether a company has cash flow forecast or not is incluenced by market capitalization and the probability of firm's financial distress. We can see that market capitalization variable and the Z-score have both expected signs of the coefficients. It means that firms possessing cash flow forecasts are more probable to be in financia distress (negative sign of Z-score) and that they are probably bigger (positive sign of LMCAP).

Table 7: Probit with CFF dependent variable representing first stage equation for Heckman two stage estimation

Intercept	VOL	Z-score	CAPINT	ACC	LMCAP	McFadden's Pseudo R-squared
-9.48	-0.02	-0.10	-0.05	<0.01	1.03	0,31
(-26.91) ***	(-1.58)	(-8.21) ***	(-0.73)	(0.39)	(27.74) ***	

*(*** significant at 99% level of significance)*
(N = 2 753)
Source: Own calculations, Thomson Reuters

We verify our discovery creating first stage Heckman's estimation employing only Z-score and LMCAP variables (table [8]). We get the same results with higher t-values. Both of the variables are significant at 95% level of significance and both of the variables have expected signs (LMCAP positive and Z-score negative). This estimation is used for the creation of the mill's ratio for every observation from our sample to be used when we explore the presence of selection bias later on consistent with Mohanram (2014).

Table 8: Probit with CFF dependent variable representing first stage equation for Heckman two stage estimation

Intercept	Z-score	LMCAP	McFadden's Pseudo R-squared
-9.69	-9.68	1.04	0.31
(-34.09)	(-10.37)	(34.52)	

(N = 4 196)
Source: Own calculations, Thomson Reuters

4.5 Accrual anomaly, robust regression and cash flow forecasts

We use dummy variables and slope dummy variables approach to research the impact of cash flow forecast on the accrual nomaly. CFD is dummy variable equal to one when a firm possess at least one cash flow estimate in specific fiscal year and zero otherwise. Models [5] and [6] show us robust regression examining the cash flow accrual anomaly using all usable firm year observations. In model [5], we get expected negative signs of coefficients for the variable ΔNOA and ΔNCO. We reject the null hypothesis that coefficient of ΔNOA is equal to zero at 95% level of significance but we do not reject that the coefficient of ΔFIN is equal to zero at 95% level of significance. Coefficient of (CFD * ΔNOA) is statistically insignificant at 95% level of significance with negative sign. The (CFD * ΔFIN) coefficient is also statistically insignificant at 95% level of significance. Results from model [5] suggest that there is no relationship between cash flow forecasts and the accrual anomaly constituting accrual anomaly to be weaker.

We breakdown the ΔNOA variable to ΔWC and ΔNCO in model [6]. T-values for the coefficients of ΔWC and ΔNCO arenegative and significant at 95% level of significance. Coefficient of ΔFIN is again statistically insignificant at 95% level of significance. We examine that all the coefficients of accrual slope dummy variables which should be significantly positive at 95% level of significance are insignificant at this level. Only exception is (CFD * ΔFIN) coefficient which is statistically significant but with unexpected sign. The (CFD * ΔWC) coefficient should be positive consistent with the suggested theory that accrual mispricing is smaller in the presence of cash flow forecasts.

Table 9: Development of accrual anomaly through time

	Model 5 Treshold regression	Model 6 Treshold regression
Intercept	-0.06 (-9.00)	-0.06 (-9.11)
ΔNOA	-0.10 (-2.11)	
ΔWC		-0.17 (-1.80)
ΔNCO		-0.08 (-1.72)
ΔFIN	-0.01 (-0.3)	-0.03 (-0.53)
ROA	-0.20 (5.06)	0.21 (5.16)
CFD	0.03 (2.8)	
CFD * ΔNOA	-0.02 (-0.26)	
CFD * ΔWC		-0.35 (-1.70)
CFD * ΔNCO		<0.01 (0.04)
CFD * ΔFIN	-0.14 (-1.56)	-0.19 (-1.99)
R-squared	0.018	0.021
Number of observations	4 322	4 322

Source: Own calculations, Thomson Reuters

We continue with estimation of other two models [7, 8] which constitute from subsample of companies. These companies consist of firms followed by at least one analyst. Coefficient of ΔNOA and ΔFIN are negative and insignificant at 95% level of significance. We come to the finding that (CFD * ΔFIN) coefficient is again with the negative sign and significant at 90% level of significance. The same applies to the (CFD * ΔNOA) coefficient which is also insignificant at 95% level of significance and has negative sign. We look at model [8]. We obtain similar results as

in model [7]. We do not reject the null hypothesis that coefficients of ΔWC and ΔNCO are equal to zero at 95% level of significance. Moreover coefficients of (CFD * ΔNCO, CFD * ΔWC, CFD * ΔFIN) have unexpected negative signs and (CFD * ΔNCO, CFD * ΔWC) coefficients are statistically insignificant at 95% level of confidence. Until now, we have observed from the models that the accrual anomaly does not mitigate in the presence of cash flow forecasts. The statistical significance and signs of coefficients is not consistent with the theory proposing mitigation of the accrual anomaly.

We introduce model [9] and [10] to control for selection bias consistent with Mohanram (2014). We have already shown that cash flow forecasts are probable to have higher market capitalization and are more likely to go into financial distress. We use this information for calculation of inverse mill's ratio consistent with Heckman (1979). Model [9] shows us that coefficient of ΔNOA is negative and we do not reject the null hypothesis that the coefficient is equal to zero at 95% level of significance. ΔFIN coefficient is positive but insignificant at 95% level of significance. (CFD * ΔNOA) coefficient is negative and we do not reject the null hypothesis that the coefficient is equal to zero at 95% level of significance. (CFD * ΔFIN) is also negative and not significant at 95% level of significance. We approach to model [10] examining the impact of cash flow forecasts on accrual anomaly with the usage of Heckman's second stage regression breaking down ΔNOA to ΔNCO and ΔWC. All ΔFIN, ΔNCO and ΔWC coefficients are negative. We also for all of them reject the null hypothesis that they are equal to zero at 95% level of significance. (CFD * ΔWC) coefficient is significant at 95% level of significance and negative. (CFD * ΔNCO) coefficient is insignificant at 95% level of significance and also negative. We reject the null hypothesis that the (CFD * ΔFIN) coefficient is euqual to zero at 95% level of significance. This coefficient is negative. We incorporate Heckman's second stage regression but the results still do not show that the accrual

anomaly mitigates.

Table 10: Development of accrual anomaly through time

	Model 7 Followed firms regression	Model 8 Followed firms regression	Model 9 Heckman's second stage regression	Model 10 Heckman's second stage regression
Intercept	-0.05 (-6.43)	-0.05 (-6.56)	-0.04 (-3.97)	-0.04 (-4.00)
ΔNOA	-0.08 (-1.38)		-0.06 (-1.34)	
ΔWC		-0.22 (-1.54)		-0.09 (-0.90)
ΔNCO		-0.07 (-1.12)		-0.06 (-1.19)
ΔFIN	0.02 (0.31)	<0.01 (0.05)	<0.01 (0.05)	<-0.01 (-0.04)
ROA	0.18 (3.53)	0.18 (3.65)	0.20 (4.97)	0.21 (5.06)
CFD	0.02 (2.16)	0.02 (2.18)	0.02 (1.66)	0.02 (1.62)
CFD * ΔNOA	-0.03 (-0.4)		-0.07 (-0.86)	
CFD * ΔWC		-0.32 (-1.45)		-0.47 (-2.24)
CFD * ΔNCO		-0.01 (-0.13)		-0.03 (-0.4)
CFD * ΔFIN	-0.18 (-1.76)	-0.22 (-2.10)	-0.15 (-1.65)	-0.20 (-2.17)
Inverse Mill's ratio			-0.01 (-2.23)	-0.01 (-2.23)
R-squared	0.013	0.017	0.022	0.025
Number of observations	3 610	3 610	4 199	4 199

Source: Own calculations, Thomson Reuters

We have estimated 6 models examining the relationship between accruals and future returns expecting that firms with cash flow forecasts would decrease the impact of accrual anomaly. We use three approaches, all of them with and without ΔNOA breakdown to ΔWC and ΔNCO. The first approach estimates normal MM

robust regression, the second approach uses MM robust regression with subsample of firms followed by analysts and the third approach estimates the Heckman' second stage regression. All the models show that the accrual anomaly probably do not alleviate because of the presence of cash flow forecasts. Most of the dummy slope variable coefficients are insignificant with unexpected signs and even the basic accrual variable coefficients are also insignificant with unforeseen signs.

4.6 Accrual anomaly, robust regression, institutional funds and quality of earnings

There has been shown that accrual anomaly probably mitigate in the past because of the institutional funds trading on the anomaly (Green *et al.*, 2010). There has been also explored that accrual anomaly alleviates when earnings quality increases (Bhojraj, Sengupta and Zhang, 2009). We estimate two models to discover if that is really the case. We introduce proxy for quality of earnings (EQ) and proxy for the increasing number of trades on the accrual anomaly (IF). We have to estimate regressions with the usage of change in net working capital as dependent variable and cash flow from operations as independent variables to compute EQ. We do not present all the regressions here because we estimate it for all the years from our dataset and there would be many tables to look at. We have to mention that we gather results consistent with Dechow and Dichew (2002) from these regressions. We use models with the usage of ΔNOA without breaking down the ΔNOA to ΔWC and ΔNCO.

Model [11] presents the usage of IF variable and its relationship with accruals. ΔNOA coefficient is significant at 95% level of significance and it is negative. We do reject the null hypothesis that ΔFIN coefficient is equal to zero at 95% level of significance. This coefficient is also negative. We discover (IF * ΔNOA) coefficient's t-value to be equal to 1.6. The t-value is close to the critical value equal to 1.645 but we still do not reject the null hypothesis that this coefficient

is equal to zero. The (IF * ΔNOA) coefficient has positive sign as expected. (IF * ΔFIN) coefficient has positive sign and it is significant at 95% level of significance. We expected both (IF * ΔNOA) and (IF * ΔFIN) coefficients to be significantly positive. It seems that the number of of assets managed by hedge funds trading on accrual anomaly (number of of assets managed by hedge funds) mitigates the magnitude of accrual anomaly.

Model [12] introduces the usage of EQ variable and its incremental relationship with accruals. As stated before, we expect that the increasing quality of earnings would alleviate accrual anomaly. ΔNOA coefficient is negative and significant at 95% level of significance consistent with accrual anomaly. ΔFIN coefficient is also negative and but we do not reject the null hypothesis that this coefficient is equal to zero at 95% level of significance. (EQ * ΔNOA) coefficient is negative and significant at 95% level of significance. (EQ * ΔFIN) coefficient is negative and we reject null hypothesis that this coefficient is equal to zero at 95% level of significance. We expected (EQ * ΔFIN) and (EQ * ΔNOA) coefficients to be statistically significant and negative which would mean that more qualite earnings (smaller variance of earnings) would mitigate incrementally the magnitude of accrual anomaly. Thus, we have got expected results consistent with the suggested theory.

Table 11: Factors mitigating accrual anomaly

	Model 11 Funds regression	Model 12 Earnings quality regression
Intercept	-0.24 (-6.95)	-0.03 (-5.00)
ΔNOA	-0.57 (-2.19)	-0.10 (-2.14)
ΔFIN	-0.74 (-2.71)	-0.02 (-0.31)
ROA	0.20 (3.57)	0.17 (3.03)
IF	0.03 (5.89)	
IF * ΔNOA	0.06 (1.6)	
IF * ΔFIN	0.10 (2.41)	
EQ		-0.96 (-1.74)
EQ * ΔNOA		-6.1 (-3.1)
EQ * ΔFIN		-3.27 (-1.90)
R-squared	0.035	0.049
Number of observations	2 940	2 940

Source: Own calculations, Thomson Reuters

Unlike the work from Mohanram (2014), Bhojraj, Sengupta and Zhang (2009) and Green *et al.* (2010), we work with up to date data using stock returns until 2016. We try to exploit this advantage to examine the specific period from 2011 to 2015. We know that linkages between economic variables might change through the time as suggested by the mitigation of accrual anomaly. We research if the suggestion that the earnings quality and hedge funds trading on accrual anomaly alleviate the accrual anomaly holds even between 2011 and 2015. For example, it might happen that even though number of hedge funds increase, they actually stop trading on the accrual anomaly because of other more profitable anomalies occurance or that the number of scientists employed by funds exploiting this strategy decrease.

We look at model [13] to assess the period from 2011 to 2015 with the examination of institutional funds trading on the accrual anomaly. ΔNOA coefficient is positive and it is insignificant at 95% level of significance. ΔFIN coefficient is also positive and we do not reject the null hypothesis that this coefficient is equal to zero at 95% level of significance. (IF * ΔNOA) coefficient is negative and not significant at 95% level of significance. (IF * ΔFIN) coefficient is also negative and we do not reject the null hypothesis that this coefficient is equal to zero at 95% level of significance. We have estimated interesting results. Coefficient's ΔFIN and ΔNOA statistical significance and signs are inconsistent with accrual anomaly and coefficiant's (IF * ΔNOA) and (IF * ΔFIN) statistical significance and signs are inconsistent with the previous finding from the model [11].

We examine results from model [14] to asses the period from 2011 to 2015 with the research of earnings quality with respect to accrual anomaly. ΔNOA coefficient is negative and it is not significant at 95% level of significance. ΔFIN coefficient is also negative and we do not reject the null hypothesis that this coefficient is equal to zero at 95% level of significance. (EQ * ΔNOA) coefficient is negative and not significant at 95% level of significance. (EQ * ΔFIN) coefficient is positive and we do reject the null hypothesis that this coefficient is equal to zero at 95% level of signifiacance. We estimated very interesting results again. Coefficient's ΔFIN and ΔNOA signs are consistent with accrual anomaly but they are not statistically significant at 95% level of significance. Coefficiant's (EQ * ΔNOA) statistical significance si not consistent with previous findings from the model [12]. Coefficiant's (EQ * ΔFIN) sign si not consistent with previous findings from the model [12].

We have foreseen to find for the model [13] and [14] similar results as in models [11] and [12]. We have got the same results for proxies for earnings quality and trading of institutional funds on the accrual anomaly consistent with Mohanram (2014), Bhojraj, Sengupta and Zhang (2009) and Green *et al.* (2010) in model [11] and [12]. We have acquired different results for the subsample period from 2011 to 2015. It seems that either the relationship between the mitigation of accrual anomaly and trade on the anomaly and quality of earnings change through the time or that this relationship was not really truth. It is also possible that we have uses bad proxies.

Table 12: Factors mitigating accrual anomaly (from 2011 to 2015)

	Model 13 Funds regression	Model 14 Earnings quality regression
Intercept	-1.58 (-4.45)	-0.04 (-3.26)
ΔNOA	2.24 (0.68)	-0.04 (-0.45)
ΔFIN	4.39 (0.91)	-0.07 (-0.57)
ROA	0.24 (2.29)	0.22 (2.10)
IF	0.20 (4.31)	
IF * ΔNOA	-0.29 (-0.68)	
IF * ΔFIN	-0.56 (-0.89)	
EQ		-4.96 (-2.15)
EQ * ΔNOA		-0.03 (<-0.01)
EQ * ΔFIN		67.02 (2.26)
R-squared	0.048	0.042
Number of observations	919	919

Source: Own calculations, Thomson Reuters

5 Conclusion

The aim of this diploma thesis is to examine if the institutional funds trading on the accrual strategy, presence of cash flow forecasts and the quality of earnings have reduced the magnitude of "accrual anomaly," which was found to be the largest equity anomaly at the time of its discovery. In other words, is the market becoming more efficient with respect to this phenomenon? We have decided to extend the previous research because the phenomenon of the mitigation of the accrual anomaly was discovered in recent history, and has not been robustly confirmed, as only a few studies were done in this field so far.

We study the phenomenon using an up-to-date dataset representing 784 companies from the United States equity market for the time period 1991 to 2015. Our thesis is inspired by the research from Green *et al.* (2010), Mohanram (2014) and Bhojraj, Sengupta and Zhang (2009), and thus represents a contribution to a recent debate in the literature. We first examine if the rapidly growing number of cash flow forecasts have helped to alleviate the accrual anomaly in the U.S. market. We compute descriptive statistics to examine the variables and the preliminary evidence of the relationship. Then, we go deeper into the relationship using a robust regression approach. We also control for sample selection bias using only the subsample of firms followed by analysts and Heckman's two stage estimation. Later, we study if the hedge funds using the accrual anomaly strategy have mitigated stock mispricing due to the accrual anomaly. This regression is run in the first stage for the whole sample and then for the subsample from 2011 to 2015. We then analyse if higher earnings quality alleviates the accrual anomaly. We do this in the first stage for the whole sample and then for the subsample from 2011 to 2015.

This thesis research led to very interesting results. The study's results suggest that incremental earnings quality might mitigate the accrual anomaly consistent with Bhojraj, Sengupta and Zhang (2009). On the other hand, the estimation for the subsample (2011-2015) does not confirm this finding. It rather suggests that there is probably no relationship between an increase in earnings quality and the decline in accrual mispricing. The relationship between institutional funds trading on the

accrual anomaly strategy and accrual anomaly seems to be confirmed for the whole sample consistent with Green *et al.* (2010). On the other hand, if we examine the results for the subsample from 2011 to 2015, this relationship does not seem to hold. It seems that the presence of cash flow forecasts do not mitigate the accrual anomaly. Descriptive statistics examining the impact of cash flow forecasts are inconclusive. Results from the robust regressions show that there is probably no relationship between the presence of cash flow forecasts and the alleviation of the accrual anomaly. Our findings are the same for all three estimation approaches using the overall sample, subsample of firms with analyst coverage, and Heckman's second stage regression.

It is interesting that we have found different results for the short term up to date period and the long term period. We think that this could be caused by the inappropriately chosen proxy variables. We know that the increasing number of assets under the management of hedge funds does not have to lead to a proportional increase in the trade on the accrual anomaly. It might have been the case when the previous research was done but does not have hold nowadays. This area is identified as an interesting topic for further research. We believe that the number of assets under hedge fund management is not a good proxy for studying the impact of the usage of accrual anomaly trading strategy. Also, it might have been just a spurious regression, since the data describing the amount of assets under the management of hedge funds grew most of the time gradually in the followed period. The use of a questionnaire or a related approach to research if the magnitude of the trade on accruals mispricing increase is identified as a potential valuable strategy. We do not know why the relationship between earnings quality and accrual anomaly does hold in the long term period and does not hold in the short term period. We suggest studying that problem deeper. We propose to modify proxy variable for the quality of earnings or to find a different one. Moreover, there may be other variables that could possibly alleviate the accrual mispricing, and these should be included in further analyses.

In conclusion, this thesis updated the literature on the accrual anomaly, an important form of market inefficiency, to include the years since the global financial crisis. Given that we did not find evidence for a mitigation of the accrual anomaly in

the time period related to institutional funds trading or incremental earnings quality, we recommend further analysis in several years, to determine if these factors continue to be insignificant. In addition, further research should seek to identify other variables that may be related to trends in the magnitude of the accrual anomaly market inefficiency.

6 References

Abarbanell, J., and V. L. Bernard. 1992. Tests of analysts' overreaction/underreaction to earnings information as an explanation for anomalous stock price behavior. *Journal of Finance* 47 (3): 1181–1207.

Alford, A. W., J.J. Jones, and M. E. Zmijewski, 1994. Extensions and violations of the statutory SEC Form 10-K filing requirements. Journal of Accounting & Economics 17, 229-256.

Ali, A., X. Chen, T. Yao, and T. Yu. 2008. Do mutual funds profit from the accruals anomaly? *Journal of Accounting Research* 46 (1): 1–26.

Allen, E., J. Larson, R. Chad, and R. G. Sloan. 2010 Accrual reversals, earnings, and stock returns. Working paper

Altman's failure prediction model. *Finweek* [online]. 2011, , 42-42 [cit. 2017-07-16]. ISSN 18124658.

Ball, Ray and Philip Brown. An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research*. 1968, 6(2), 159-178

Barber, B., R. Lehavy, M. McNichols, and B. Trueman. 2001. Can investors profit from the prophets? Security analyst recommendations and stock returns. Journal of Finance 56: 531–563.

Barber, B., R. Lehavy, M. McNichols, and B. Trueman. 2006. Buys, holds, and sells: The distribution of investment banks' stock ratings and the implications for the profitability of analysts' recommendations. *Journal of Accounting and Economics* 41: 87–117.

Beaver, W.H. Perspectives on Recent Capital Market Research. *The Accounting Review*. 2002, **77**(2), 453-474

BEISLAND, Leif Atle. A review of the value relevance literature. *The open business journal*. 2009, **2**(1), 7-27

Biddle GC, Seow GS, Siegel AF. Relative versus incremental information content. Contemp Account Res 1995; 12: 1-23.

Bhojraj, S., P. Sengupta and S. Zhang. 2009. Restructuring charges, regulatory changes and the accruals anomaly. Working Paper, Cornell University/George Mason University.

Borges, Maria. The Ex-Dividend Day Stock Price Behavior: The Case of Portugal. *Atlantic Economic Journal*. 2008, 36(1), 15-30

Bradshaw, M. T., S. A. Richardson, and R. G. Sloan. 2001. Do analysts and auditors use information in accruals? *Journal of Accounting Research* 39 (1): 45–74.

Call, A. 2008. Analysts' cash flow forecasts and the relative informativeness and pricing of the cash component of earnings. Working paper , University of Georgia

Call, A., S. Chen and Y. Tong. 2009. Are analysts' earnings forecasts more accurate when accompanied by cash flow forecasts? *Review of Accounting Studies* 14: 358-391

Call, A., S. Chen and Y. Tong. 2012. Are analysts' cash flow forecasts naïve extensions of their own earnings forecasts? *Contemporary Accounting Research* (forthcoming).

Charitou A., Lambertides N and Trigeorgis L. Distress Risk, Growth and Earnings Quality. *Abacus*. 2011, 47(2), 158

DeFond, M. and M. Hung. 2003. An empirical analysis of analysts' cash flow forecasts. *Journal of Accounting and Economics* 35: 73–100.

Dechow PM. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. J Account Econ 1994; 18: 3-42.

Dechow, P.M., S.A.Richardson, and R. G. Sloan. The Persistence and Pricing of the Cash Component of Earnings. *Journal of Accounting Research*. 2008, 46(3), 537

Dechow, P. M., W. Ge, C. R. Larson, and R. G. Sloan. 2011. Predicting material accounting misstatements. In *Contemporary Accounting Research*, Forthcoming.

Dechow, P. M., and W. Ge. 2006. The persistence of earnings and cash flows and the role of special items: Implications for the accrual anomaly. *Review of Accounting Studies* 11: 253–296.

Dechow, P.M. , and I. Dichev, 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77 (Supplement): 35-59.

Fabozzi, Frank J. *The handbook of financial instruments*. Hoboken, New Jersey: Wiley, c2002. ISBN 0471220922.

Francis, J., R. Lafond, P. Olsson, and K. Schipper. 2007. Information uncertainty and post-earnings-announcement-drift. *Journal of Business Finance & Accounting* 34 (3–4): 403–433

Francis J, Schipper K, Vincent L. The relative and incremental explanatory power of earnings and alternative (to Earnings) performance measures for returns. *Contemp Account Res* 2003; 20: 121-64.

Givoly, D., C. Hayn and R. Lehavy. 2009. The quality of analysts' cash flow forecasts. *The Accounting Review* 86: 1877-1911.

Green, J., J. R. M. Hand, and M. Soliman. 2010. Going, going, gone? The demise of the accruals anomaly, *Management Science*

Groysberg, B., P. Healy, G. Serafeim, D. Shanthikumar, and G. Yang. 2010. The performance of buy-side analyst recommendations. Working paper, Harvard Business SchoolHealy, Paul M. a James M. Wahlen. A Review of the Earnings Management Literature and Its Implications for Standard Setting. *Accounting Horizons*. 1999, 13(4), 365-383

Heckman, J. 1979. Sample selection bias as a specification error. *Econometrica* 47: 153–61

Chan, K., L. K. C. Chan, N. Jegadeesh, and J. Lakonishok. 2006. Earnings quality and stock returns, *Journal of Business* 79 (3): 1041–1082.

Jílek, Josef. Akciové trhy a investování. Praha: Grada, 2009. Finanční trhy a instituce. ISBN 978-80-247-2963-3.

Lang, Mark, and Russell Lundholm. "Cross-sectional determinants of analyst ratings of corporate disclosures." *Journal of accounting research* (1993): 246-271.

Leippold, M., and H. Lohre. 2010. Data snooping and the global accrual anomaly. Working paper. 2010, EFA 2007 *Ljubljana Meetings Paper.*

Leone, A., Minutti-Meza, M. and C. Wasley. 2012. Outliers and inference in accounting research. Working paper, University of Miami.

Lerman, A., J. Livnat, and R. R. Mendenhall. 2008. The high-volume return premium and post-earnings announcement drift. Working paper.

Lev, B., and D. Nissim. 2006. The persistence of the accruals anomaly. *Contemporary Accounting Research* 23 (1): 193–226.

Malkiel, Burton G. and Eugene F. Fama. 1970. Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*. 1970, 25: 383-417 .

Mankiw, N. Gregory. 2014. *Principles of economics*. Seventh edition.

Mohanram, Partha S. Analysts' Cash Flow Forecasts and the Decline of the Accruals Anomaly. *Contemporary Accounting Research*. 2014, 31(4), 1143-1170.

Pincus, M., S. Rajgopal, and M. Venkatachalam. 2007. The accrual anomaly: International evidence. *Accounting Review* 82 (1): 169–203.

Porter, Michael E. The five competitive forces that shape strategy. *Harvard Business Review* [online]. 2008, 86(1), 78-93 [cit. 2016-12-26]. ISSN 00178012.

Radhakrishnan, S. a S.-L. Wu. Analysts' Cash Flow Forecasts and Accrual Mispricing. *Contemporary Accounting Research*. 2014, 31(4), 1191 - 1219.

Richardson, S. A., R. G. Sloan, M. T. Soliman, and I. Tuna. 2005. Accrual reliability, earnings persistence and stock prices. *Journal of Accounting & Economics* 39 (3): 437–485.

Richardson, S. A., R. G. Sloan, M. T. Soliman, and I. Tuna. 2006. The implications of accounting distortions and growth for accruals and profitability. *Accounting Review* 81 (3): 713–743.

Sadka, R. 2006. Momentum and postearnings-announcement drift anomalies: The role of liquidity risk. *Journal of Financial Economics* 80:309–349.

Sloan, R. G. 1996. Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review* 71 (3):289–315.

Smith, B. Mark. A history of the global stock market: from ancient Rome to Silicon Valley. *University of Chicago press*, 2004.

Subramanyam, K. R. Financial statement analysis. Eleventh edition. 2013. ISBN 978-0-07-811096-2.

Subramanyam KR, Venkatachalam M. Earnings, cash flows, and ex Post intrinsic value of equity. Account Rev 2007; 82: 457-81.

Teoh, T. J. Wong, and G. Rao. 1998. Are accruals during initial public offerings opportunistic? *Review of Accounting Studies* 3: 175–208.

Thomas, J. K., and H. Zhang. 2002. Inventory changes and future returns. *Review of Accounting Studies* 7 (1): 63–187.

Why some succeed. *Fortune* [online]. 1994, 130(9), 74-74 [cit. 2016-12-28]. ISSN 00158259.

Zacks, Leonard, ed. The handbook of equity market anomalies: translating market inefficiencies into effective investment strategies. Vol. 2. John Wiley & Sons, 2011.