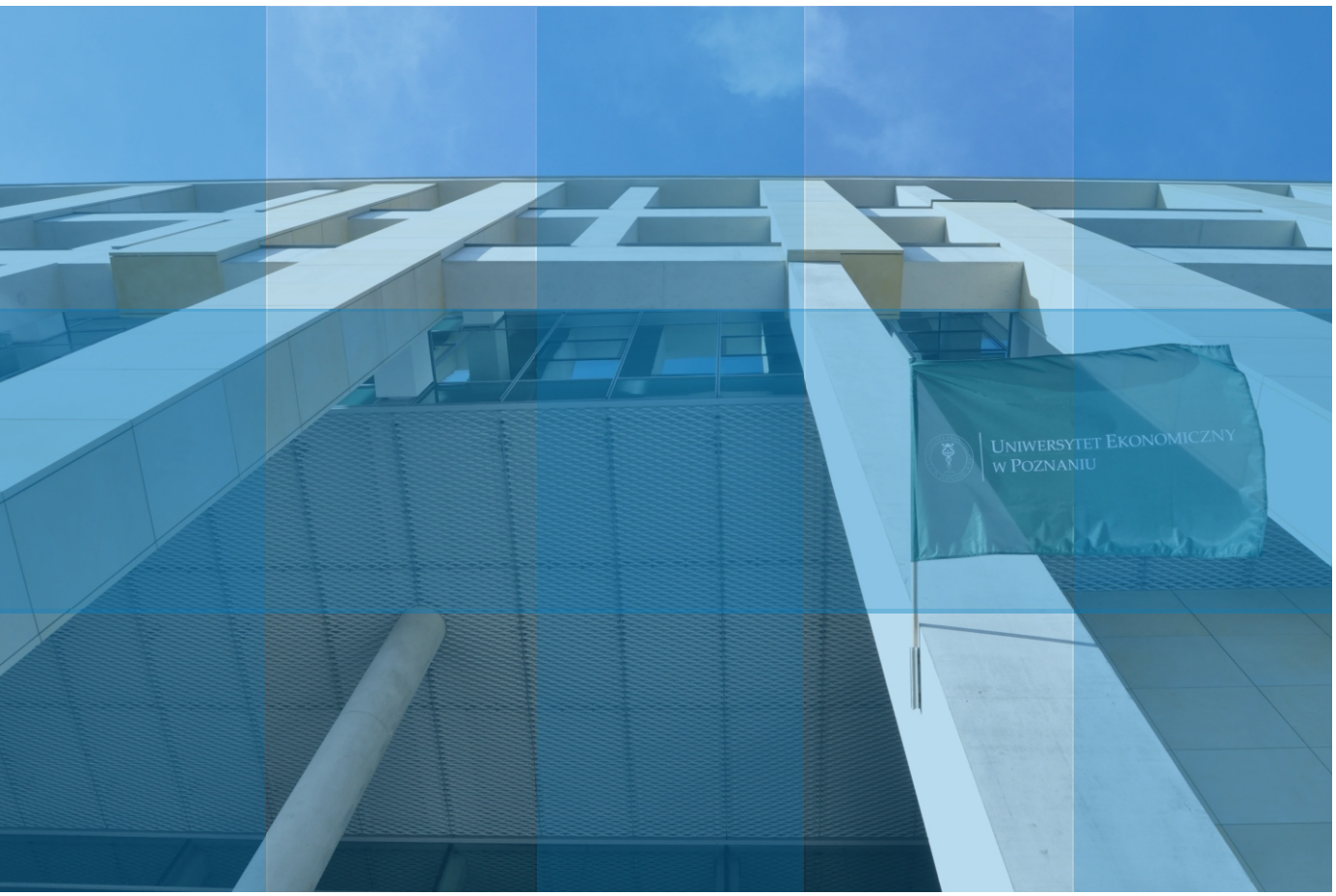
Research Papers in Economics and Finance

Vol. 3, No 2(2)

ISSN 2543-6430



Poznań University of Economics and Business

Faculty of Economics Publishing

Faculty of Economics
Poznań University of Economics and Business
Aleja Niepodległości 10, 61-875 Poznań, Poland

Published Scholarly Papers

RESEARCH PAPERS IN ECONOMICS AND FINANCE

ISSN 2543-6430

Vol. 3, No 2

https://doi.org/10.18559/ref.2018.2

2018

EDITORIAL BOARD
Wolfram ELSNER, Bremen University, Germany
Monika KACZAŁA, Poznań University of Economics and Business, Poland
Nadezda KIRILLOVA, Financial University under the Government of the Russian Federation, Russi
Aleksy KWILINSKI, The London Academy of Science and Business, London, England
Joanna MAZURKIEWICZ, Poznań University of Economics and Business, Poland
Mihai MUTASCU, ESCE International Business School Paris, France
Olga POPOVA, Donetsk National Technical University (Pokrovsk), Ukraine
Louis - Philippe ROCHON, Laurentian University, Canada
Amir SAFARI, Head of Insurance Research Center, Iran
Nadiia SHMYGOL, Zaporizhzhya National University, Ukraine
Aleksandr TSYGANOV, Financial University under the Government of the Russian Federation, Russia
Guillaume VALLET, University of Grenoble Alpes, France
Ivan VERBANOV, D. Tsenov Academy of Economics, Bulgaria
Galip YALMAN, Middle East Technical University, Turkey

EDITORIAL COMMITTEE
Piotr LIS (Editor in Chief), Poznań University of Economics and Business, Poland
Edyta MAŁECKA-ZIEMBIŃSKA, Poznań University of Economics and Business, Poland
Piotr MANIKOWSKI, Poznań University of Economics and Business, Poland
Katarzyna SZARZEC, Poznań University of Economics and Business, Poland
Agnieszka ZIOMEK, Poznań University of Economics and Business, Poland
Hanna KOŁODZIEJCZYK (Executive secretary), Poznań University of Economics and Business, Poland

Proofreader: Krzysztof Stec

DTP Editor: Karolina Dmochowska-Dudek

Research Papers in Economics and Finance
ISSN 2543-6430
Publisher: Faculty of Economics, Poznań University of Economics and Business
Aleja Niepodległości 10, 61-875 Poznań, Poland
Email: ref@ue.poznan.pl
www.ref.ue.poznan.pl

Creative Commons License
Attribution-NonCommercial CC BY-NC

Research Papers in Economics and Finance

RESEARCH PAPERS IN ECONOMICS AND FINANCE

ISSN 2543-6430

Vol. 3, No 2, 2018

CONTENTS

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

Creative Commons Attribution-Non Commercial 4.0 International Public License
https://doi.org/10.18559/ref.2018.2.0

PREFACE

Dear Readers,

I have the pleasure of presenting to you the second issue of the research journal entitled "Research Papers in Economics and Finance" (REF), published by the Faculty of Economics at Poznań University of Economics and Business.

"Research Papers in Economics and Finance" is a quarterly journal, with the second issue this year containing five research papers. The first and the second paper were presented during the 10th Environmental PhD Candidates' Conference "Economy. Technology. Society." (GTS), organised by the Heads of Doctoral Studies together with the PhD Council of the Poznań University of Economics and Business.

The purpose of the conference was to share knowledge and expertise in the areas of economy, technology and society between PhD Candidates and young academics from the University and from other economic departments in Poland. The conference was held under an honorary patronage of: the Rector of the Poznań University of Economics and Business – Professor Maciej Żukowski, PhD; the Vice-Rector for Research and International Relations of the Poznań University of Economics and Business – Professor Elżbieta Gołata, PhD; the Polish Economic Society Branch in Poznań and the Poznań Society for the Advancement of Arts and Sciences. During the conference, there were also workshops with the following business practitioners: Chias Brothers Europe Sp. z o. o., Franklin Templeton Investments Poland and the Wielkopolska Province Development and Promotion Fund.

Five research papers were published in this issue of the journal. The first one focuses on changes in the employment structure caused by the development of automation technologies. The second article presents the role of the social responsibility of the state in shaping the reputation of the largest donors of official development assistance. The third article describes the theoretical background of motivation and market statistics of distressed investments on global mergers and the acquisitions market. Another article focuses on the efficiency of the R&D sector in the European Union countries. The final article presents the interactions between tax sheltering and other instruments of fiscal policy in Nigeria.

In the paper entitled "**The impact of low interest rates on the debt of Polish listed companies**" by Katarzyna Schmidt, the author analyses the relations between monetary policy (in particular low interest rates) and the level of indebtedness of Polish listed companies. The analysis of these relations is important because Central Bank decisions have an impact on the whole eco-

nomy, in particular on financial entities and enterprises decisions. An empirical study has shown that there is a strong and negative relationship between the 3M WIBOR interest rate level and the median of the debt ratio. In particular, the author concludes that interest rates have an impact on the level of indebtedness of companies, yet they operate with a time lag.

The second article entitled "**The reputation of the biggest official development assistance donors**" by Marcin Robert Leszczyński and Aleksandra Anna Rabczun presents the role of the social responsibility of the state in shaping the reputation of the largest donors of official development assistance. The authors explain a connection between the international public relations and the official development assistance. In the conclusions, the authors indicate a connection between reputation and development assistance and suggest that development assistance is a quantitative exemplification of the social involvement of the state.

In the third paper "**Why and how healthy enterprises invest in distressed companies? – the theoretical background of motivation and market statistics of distressed investments on global M&A market**", Mateusz Mikutowski discusses areas where the theory of the entrepreneurial opportunities as a part of management studies are reflected in mergers and acquisitions operations. The paper also describes the utilization of entrepreneurial opportunities by strategic investors and financial investors. Additionally, the author also explains the motivation of enterprises to make mergers and acquisitions on a global market.

The aim of the next paper "**Efficiency of the R&D sector in the EU states. Does the source of funds matter?**", written by Kamil Albert Homski, is to analyse the efficiency of the R&D sector in the European Union countries and examine the relationship between the efficiency of the sector and the structure of its financing. In order to measure the efficiency of the R&D sector in the analysed countries, the author used the DEA method. In conclusion, the author suggests that the public sector's share in the R&D financing structure affects the efficiency of the R&D sector positively, as opposed to the private sector's. The author also indicates some limitations of the method applied and directions for further research.

Finally, the paper entitled "**Effect of tax sheltering on earnings management in Nigeria**", by Osegbue, Ifeanyi Francis, Nweze Austin, Ifurueze Meshack and Nwoye Chizoba Mary discusses the interactions between tax sheltering and other instruments of fiscal policy as well as its impact on the Modified Jones earnings model. The study covers 116 companies on the Nigerian stock exchange in the years 2009-2016. The empirical analysis is based on the following methods: descriptive statistics, correlation matrix and generalized method moments regressions. In the conclusions, the authors indicate a significant and positive impact of the Modified Jones earnings model on the quoted firms. The authors also discuss the issue of the firms' manipulation of earnings through abnormal accruals.

As the Conference Organizing Committee, we hope that the articles of young researches presented in this journal will become a stimulus to interesting discussions in the field of economy, technology and society.

Yours faithfully,

Katarzyna Woźniak, M.Sc.
– Chair of the PhD Council PUEB

Creative Commons Attribution-NonCommercial 4.0 International Public License
https://doi.org/10.18559/ref.2018.2.1

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

The impact of low interest rates on the debt of polish listed companies

Katarzyna Schmidt[1]

[1]Poznan University of Economics and Business, Poland

ABSTRACT

Central bank decisions have an impact on the whole economy. Increasing or lowering interest rates as part of a specific policy determines not only changes in macroeconomic aggregates or decisions of financial entities, such as banks, but also has a significant impact on business decisions. Low interest rates, which have been maintained for several years, encourage reflection on the impact of interest rates on the financing structure of companies. The main objective of the research is to verify the relations between monetary policy, in particular low interest rates, and the level of indebtedness of Polish listed companies. The analysis showed that the level of total interest-bearing liabilities for the selected sample of companies remains in a clear upward trend, and interest rates – in a downward trend, excluding the increases in 2008 and 2012. The Pearson correlation for the variables in question should be considered strong, especially in the case of the relationship between long-term interest-bearing liabilities and interest rates. Considering the above, it should be noted that interest rates influence the level of indebtedness of companies, bearing in mind that this is a transmission channel of monetary policy, which operates with a time lag.

Keywords: interest rates, interest-bearing liabilities, debt, monetary policy.

1. Introduction

Each company must have necessary capital resources to develop. Nowadays, entities can benefit from many sources of financing divided into the so-called sources of internal and external financing. External financing sources include credit and debt securities. Both credit and bonds are interest-bearing instruments, which, in view of the subject matter of this article, will form the basis for further consideration. When choosing a source of financing, entities take into account a number of factors, such as: availability of financing, the risk associated with financing, the strategy of the company or the cost of raising capital. In 1967, N. Baxter in his article "Leverage, Risk of Ruin and the Cost of Capital", noted that excessive debt increases can lead to financial difficulties and, in extreme cases, even bankruptcy. The entity's ability to service debt is therefore a key factor determining the ability or willingness to borrow foreign capital. Due to the fact that the cost of obtaining a loan or issuing bonds depends mainly on the interest rate[5] that the entity is able to negotiate with a financial institution, which in turn is conditioned by the level of interest rates of the National Bank of Poland (hereinafter referred to as NBP), the decisions made by the central bank as part of monetary policy become important. Monetary policy, apart from fiscal policy, is a part of the economic policy conducted by the states in order to influence the economy of a given country. In the case of monetary policy,

[5] The author omits here all costs related to credit, such as preparatory commission or fees related to early repayment of the loan due to the relative independence of financial institutions in shaping the levels of the above fees.

decisions taken by the state authorities are transferred to all market participants through the so-called transmission channels of monetary policy impulses. The basic channels for transmitting monetary policy impulses include: the exchange rate channel, the credit channel, the asset price channel and the interest rate channel (Egert, MacDonald 2009). "The mechanism for transmitting monetary policy impulses determines the way in which monetary authorities influence the decisions taken by economic life participants, as well as their further interactions. This process results in changes in such monetary variables as: central bank money, free liquidity reserves, money supply, volume of loans, interest rates, as well as the value of financial assets of various degrees of liquidity" (Szydłowski 2017, p. 102). This means that an increase or decrease in the nominal NBP interest rates translates into interest rates on the interbank market, which in turn has a direct impact on the interest rates on commercial debt instruments offered by financial institutions to consumers and entrepreneurs.

The policy of low interest rates pursued by central banks for years poses new challenges for the economy, and thus influences decision making by economic entities in previously unknown conditions. A long-term regime of low interest rates is a new situation, at least for the European and Polish economies. The expansive monetary policy in response to the global financial crisis of 2007-2009 continues and interest rates in the European Union are below zero. Previous reflections by economists on low interest rates have usually focused on the Japanese economy, which was the forerunner of lowering the interest rate close to zero in the 1990s. However, these considerations were usually of a macroeconomic rather than microeconomic nature. In Poland, Andrzej Rzońca has been discussing low interest rates for several years, but his publications are also of a more macroeconomic nature, showing the impact of monetary policy on the whole economy and presenting the issue from the perspective of central banks. The apparent lack of a comprehensive approach to the problem from the point of view of economic entities, which are not financial institutions, operating in conditions of low interest rates, confirmed the author's conviction that research in this area is necessary. Therefore, the main objective of the research is to verify the relations between monetary policy, in particular low interest rates, and the level of indebtedness of Polish listed companies. In order to achieve the main objective, two hypotheses have been established. Hypothesis I states that: *The lower the level of interest rates, the higher the share of interest-bearing liabilities in total liabilities in the research group under analysis over the years 2004-2017*, whereas hypothesis II reads as follows: *Changes in interest rate levels are more negatively correlated with the level of long-term interest-bearing liabilities than with the level of short-term interest-bearing liabilities in the research group under analysis over the years 2004-2017*. The assessment of individual research hypotheses was made on the basis of the research conducted, described further in the article.

The research contributes significantly to the economic and financial literature. The analysis of decisions taken by economic entities in conditions of low interest rates, i.e. when the central bank conducts monetary policy considered unconventional (Rzońca 2014), constitutes a significant cognitive value. By analysing the level of interest-bearing liabilities of Polish listed companies over the years, we can observe the reactions of entities to changing interest rates. The results of the research allow us to assess the effectiveness of the transmission channel of monetary policy impulses, which is an added value from both a scientific and practical points of view. To emphasize the meaning of the presented enquiry, it is worth mentioning that the author is currently developing the area of low interest rates in fusion with the debt of companies. Following research papers will not only show how this phenomenon functions in Poland, but also in the selected European countries.

2. Literature review

Unconventional monetary policy as a result of the financial crisis, which has lasted more than ten years since the outbreak of the global crisis in 2007, makes it possible for entities to obtain cheaper financing. The maintenance of low interest rates and often negative interest rates[6] by central banks is both supported and strongly criticized by scientists and economic practitioners, with a clear advantage of the critics. In her speech "Low interest rates: King Midas' golden touch", Kristin Forbes (2015) calls into question the positive effects of low interest rates, wondering whether "cheap money" does not allow less efficient companies to survive, and thus whether it does not reduce the overall efficiency of sectors. R. J. Caballero,

[6] The European Central Bank's deposit interest rate has been below zero since 2016. The Swiss National Bank also keeps interest rates below zero.

T. Hoshi and A. K. Kashyap (2008) also raise the issue of non-profit borrowers. "Zombie" companies, as they are called by the authors mentioned above, create continuous distortions that reduce the number of new jobs created and lower productivity. Low interest rates translate into the price of money (Fisher 1930), which means that companies can afford additional financing because they are able to service debt. J. Klepacki (2016) states that the unconventionality of monetary policy may disrupt the classic mechanisms of reactions and actions of market participants, which will lead to the emergence of speculative bubbles on the real estate and financial asset markets. These fears are all the more justified because, according to sources, indirect foreign capital[7] "is the most common debt instrument – not only among small unlisted companies, but also among listed companies" (Damodaran 2007, p. 759). On the other hand, economists stress that the expansionary monetary policy is intended to stimulate the economy by increasing investment expenditure, which in turn, through a multiplier, would lead to a higher growth of the real Gross Domestic Product (Woźniak, Lisowski 2017). As a result, unemployment would be reduced (Powell 2017) and the economy would recover. However, this mechanism is applied when lowering interest rates is a short-term measure, so the question arises as to what happens when low interest rates persist for a few or even several years. How do economic entities react to unconventional monetary policy – do they constantly increase their debt?

Studies conducted by K. Szydłowski (2017, p. 108), based on the data obtained from the National Bank of Poland, the Polish Financial Supervision Authority (hereinafter referred to as KNF) and the Central Statistical Office (hereinafter referred to as GUS) for the years 2009-2014, allow us to observe "a relatively strong correlation between interest rates and the volatility of corporate capital structures. The upward trend in debt ratios was recorded in periods of interest rate falls and their persistence at a relatively low level". It should be stressed, however, that the research conducted by the author mentioned above was carried out for a series of years ending in 2014, which means that no analysis was carried out for the next 3 years, during which interest rates remained at low levels. Moreover, the value of loans was analysed from the perspective of the banking portfolio and not from the perspective of corporate balance sheets. Similar studies, however, on a much longer time series, i.e. for the years 1997-2010, were conducted by Katarzyna Łach (2012). In this case, the author analyzed the scope of the data from the NBP databases, as well as the Central Statistical Office (GUS) and the Warsaw Stock Exchange. After their synthesis, it was stated that „the interest rate is not a determinant of the financing strategy, understood as a decision at the level of indebtedness of the company and the scale of use of credits and loans to finance operations" (Ibidem, p. 230). This different opinion gives rise to doubts, and it is necessary to consider in detail the causes of discrepancies. Therefore, it is worth taking a look at a comprehensive study conducted by Anna Białek-Jaworska, Aneta Dzik and Natalia Nehrebecka (2014). The authors have shown that "monetary policy through the interest rate channel increases the willingness of medium-sized companies to take out long-term bank loans. Moreover, it also increases the utilisation rate of (new) long-term bank loans taken out in large companies to a greater extent than in small companies" (Ibidem, p. 190). In their research, the authors also verified the impact of WIBOR 3M on the companies' financial leverage[8], proving that "the higher WIBOR 3M in the current period, the lower the financial leverage of large companies" (Ibidem, p. 310). An analogous dependence has been shown by the authors for small and medium-sized companies. However, it should be noted that WIBOR 3M affects the financial leverage with a delay of two periods. It seems, therefore, that discrepancies in the final conclusions resulting from the work carried out may be caused by different characteristics of companies or significant heterogeneity of research groups. The assumptions indicated above may be confirmed by an analysis of foreign literature. Brown, Ongena, Popov and Yesin (2011) analysed data from 2004-2005 for companies in 20 countries of Western and Eastern Europe, comparing the supply and demand for bank credit. In their study, they showed that in high interest rate conditions, Eastern European companies are more likely not to apply for credit despite the need for capital than in Western Europe. Gosh (2010), in his study on large Indian companies using data for the years 1995-2007, stated that changes in monetary policy translated into the structure of liabilities of

[7] Intermediate capital includes loans and borrowings – classification proposed by E. Chojnacka in *Struktura kapitału spółek akcyjnych w Polsce w świetle teorii hierarchii źródeł finansowania*, 2012.

[8] Defined by Anna Białek-Jaworska, Aneta Dzik and Natalia Nehrebecka (2014] as the ratio of total debt (foreign capital less provisions for income tax liabilities and liabilities) to total debt and equity at book value less revaluation reserve.

non-financial entities, but what is interesting, the restrictive monetary policy was accompanied by an increase in total debt. Also Charles Muthama, Peter Mbaluka and Elizabeth Kalunda (2013) came to interesting conclusions in their research conducted on companies listed on the Nairobi Stock Exchange. The analysis of the data for 1999-2008 showed that the level of interest rates has a positive impact on the long-term debt ratio and the total debt ratio, and a negative impact on the short-term debt ratio, which means that if interest rates rise, companies will be more willing to finance themselves with long-term debt than with short-term debt.

As can be seen from the above, monetary policy as a determinant of the financing structure of companies has been the subject of numerous studies and articles. However, the results of the research and the conclusions drawn from them are divergent. Moreover, there are no studies that would attempt to observe the reaction of the structure of financing of companies and the debt ratio of companies to long-term low interest rates. Only research conducted over a period of time, in which we can observe low interest rates for several or more years, can lead to the assessment of the effects of unconventional monetary policy.

3. Methodology

The study discussed here was conducted on the companies listed on the main market of the Warsaw Stock Exchange. All entities listed on the Warsaw Stock Exchange since 2003 or earlier and continuously until the end of 2017 were included in the research sample. Therefore, the time series constituted the full years 2004-2017. All entities which were financial institutions or conducted financial, insurance, investment activity, etc., were eliminated from the research sample. In addition, companies which started operating as National Investment Funds were eliminated. After further verification, companies with a postponed financial year and companies whose data were incomplete were removed from the sample. The financial data of the entities under analysis were taken from the Notoria database. Finally, 84 entities listed on the Warsaw Stock Exchange were examined. The table below presents the individual steps of elimination and the conditions for the selection of the research sample.

Table 1: Conditions for the selection of the research sample

No.	Description	Number of companies which met the condition
1.	Companies listed on the Warsaw Stock Exchange in 2003, main market	203
2.	Companies listed in 2003 and continuously until the end of 2017	121
3.	Companies meeting condition 2. + without banks	113
4.	Companies meeting condition 3. + without companies engaged in financial and investment activities and without National Investment Funds	98
5.	Companies meeting condition 4. + without companies with a postponed financial year or whose data are incomplete	84

Source: own study.

The selected data sample was subjected to statistical analysis, verifying the levels of interest-bearing liabilities over the years, the share of particular groups of liabilities and debt ratios[5]. Then, the data obtained from the companies' balance sheets were compared with the interest rate levels, assessing the relationship between the variables examined by means of the Pearson correlation coefficient. The Pearson correlation coefficient is one of the most important coefficients used in correlation analysis. This factor should be used to describe the linear relationship between two variables. The correlation coefficient may take positive or negative values, which indicates the direction of the relationship between the variables. The value of the coefficient indicates its strength. The coefficient assumes values in the range <-1;1>. The closer it is to |1|, the stronger the relationship between the variables. Usually the following interpretation of the Pearson correlation coefficient is assumed: |0.0-0.2| – very

[5] The debt ratio in this article shall be understood as the quotient of the sum of the company's interest-bearing liabilities and liabilities.

weak correlation, |0.2-0.4| – weak correlation, |0.4-0.6| – moderate correlation, |0.6-0.8| – strong correlation, and |0.8-1.0| – very strong correlation (Pułaska-Turyna 2011]. Additionally all correlation coefficients were verified if they are statistically significant using student's t-test and p-value. In the presented article, WIBOR 3M was considered to be a representative interest rate due to the very strong, significant correlation with the NBP rates. The Pearson correlation coefficient for the reference rate and WIBOR 3M in the period of 2004-2017 was close to 0.96, for the lombard rate over 0.96, for the deposit rate over 0.94, and for the rediscount rate over 0.95.

Table 2: Correlation coefficients between the NBP interest rates and WIBOR 3M

Specification	Coefficient value	Student's t-test	p-value	Statistical significance α = 0.05
Reference rate and WIBOR 3M	0.96	11.8040	5.8084E-08	yes
Lombard rate and WIBOR 3M	0.94	12.6973	2.5709E-08	yes
Deposit rate and WIBOR 3M	0.94	9.9514	3.7747E-07	yes
Rediscount rate and WIBOR 3M	0.95	11.0541	1.2005E-07	yes

Source: own study.

4. Results

The first stage of the study was the analysis of interest rates. The 3M WIBOR interest rate was analysed. Due to the fact that WIBOR 3M is the interbank market rate, the average interest rate of total loans for non-financial companies, published monthly by the National Bank of Poland, was also analysed. The average loan interest rate is an effective interest rate, calculated for each newly concluded or renegotiated agreement in a given reporting month separately. The formula applied by the central bank is based on the fundamental principle of the time value of money (NBP 2018). The chart below presents how the variables developed in the years 2004-2017.

As the analysis shows, the interest rates represented in this case by WIBOR 3M showed a downward trend over the years 2004-2017. An exception is the years 2008 and 2012, when interest rates increased. The increase in 2008 was caused by the need to normalize the growth of inflation, which in July and August 2008 reached 4.8%. The second phase of the increases was in turn caused by good prospects for improvement of Poland's economic situation, as evidenced by the economic growth at the level of 4.3% and the fear of inflation growth (Pyka and Nocon 2016). As can be seen in the presented chart, the average interest rate of total loans for non-financial companies is completely dependent on the interbank market interest rate. The curve testifying to changes in the range of the variable in question is almost parallel to the curve responsible for WIBOR 3M. This is confirmed by the Pearson correlation coefficient, which for the variables in question was 0.98 (statistically significant, α=0,05). Therefore, only one variable, i.e. WIBOR 3M, was used in further analyses.

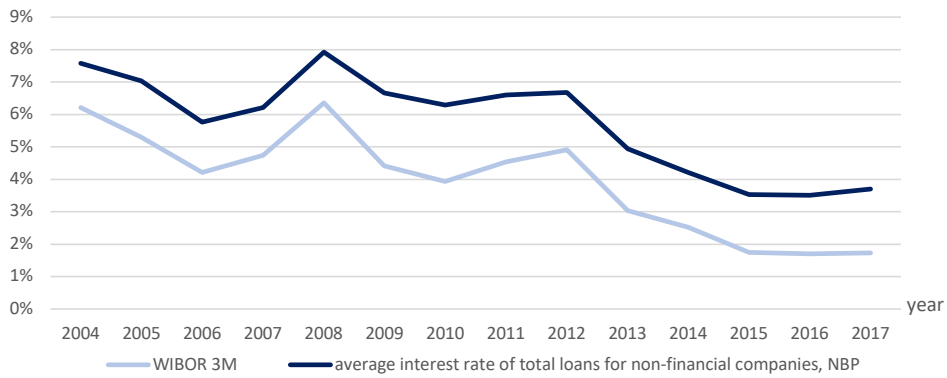


Figure 1. WIBOR 3M and average interest rates of total loans in 2004-2017
Source: own study based on the NBP data "Interest rate statistics" and the data from money.pl website

After analysing trends in interest rate levels, the liabilities of the selected sample of companies were analysed. For each company, the level of interest-bearing liabilities was determined, which included long-term loans and borrowings, long-term bond liabilities, financial liabilities (loans and borrowings) and short-term liabilities on the account of bonds. Then, individual categories for the whole sample were summed up for individual years. Additionally, the share of particular groups of liabilities in total interest-bearing liabilities was calculated in order to show the changes taking place over the years. The results are presented in the charts below.

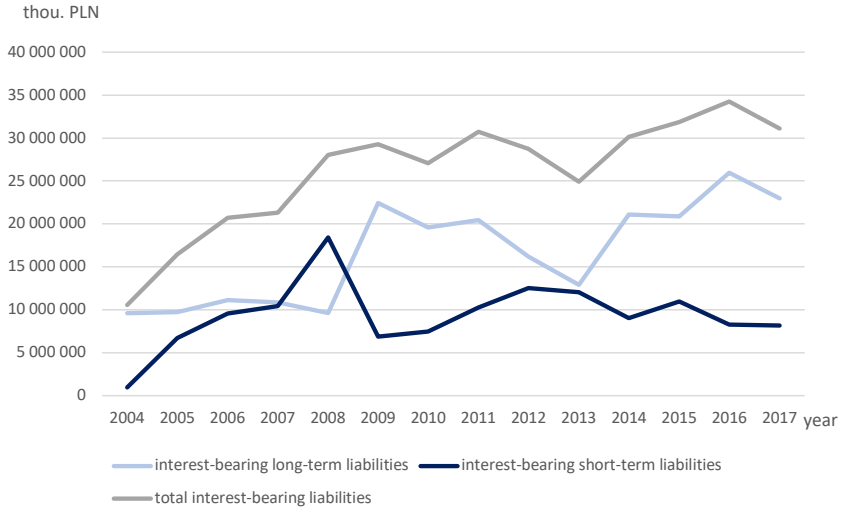


Figure 2. Liabilities over 2004-2017 (thousand PLN)
Source: own study based on data from the Notoria database

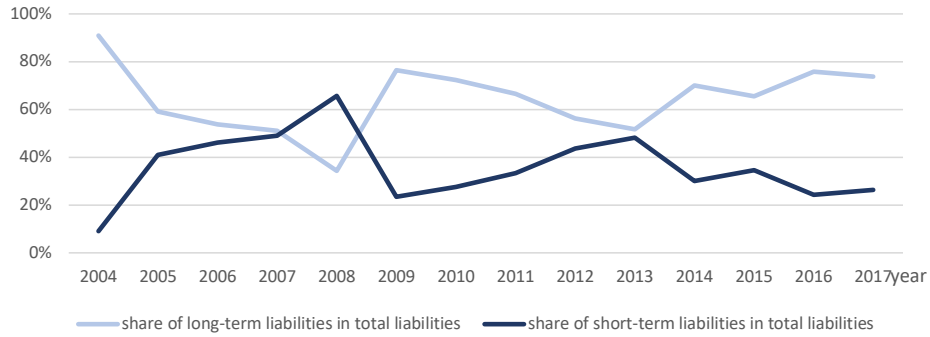


Figure 3. Share of long-term and short-term liabilities in total liabilities
Source: own study based on data from the Notoria database

On the basis of the above data, it was stated that for the sample under analysis, total interest-bearing liabilities are characterised by an upward trend, with long-term interest-bearing liabilities having a greater impact on the increase in total liabilities. Short-term interest-bearing liabilities do not show a clear upward or downward trend, as from 2009 to 2017 they remained at a similar level. As can be seen in Figure 2, in 2008 there was an incremental increase in short-term liabilities; however, the increase in question was of a one-off nature. When analysing the share of long-term liabilities in total liabilities, we can distinguish four periods. From 2004 to 2008, the share of interest-bearing long-term liabilities in total liabilities decreased, from 2008 to 2009 it increased, and then it started to decrease again from 2009 to

2013. From 2013, we can observe an upward trend in the share of interest-bearing long-term liabilities in total interest-bearing liabilities. The share of short-term interest-bearing liabilities was characterised by exactly the opposite trend, because, as shown in Figure 3, the share of long-term and short-term liabilities in total liabilities is two curves which are a mirror image. Therefore, whenever the share of current liabilities increases, the share of long-term liabilities decreases and vice versa.

After analysing individual variables being the subject of the study, an attempt was made to compare interest-bearing liabilities of companies with the level of interest rates. The variables in question are presented in the chart below.

It should be noted that interest rates in the analyzed time series are in a clear downward trend, and liabilities, excluding short-term liabilities, are in an upward trend. The most noticeable increase in long-term liabilities can be seen from 2013, when interest rates are at their lowest levels. In the periods characterized by higher interest rates, companies increase the short-term debt (2008 or 2012).

In order to determine the relationships between the variables studied, a statistical analysis was made using the Pearson correlation coefficient. The Pearson correlation coefficient was calculated for the following variables:
- total interest-bearing liabilities and WIBOR 3M interest rate in 2004-2017,
-value of interest-bearing long-term liabilities and WIBOR 3M interest rate level in 2004-2017,
- value of short-term interest-bearing liabilities and WIBOR 3M interest rate in the years 2004-2017.

Calculations of the above variables showed that for the first pair of variables the Pearson correlation coefficient was -0.65, which means that there is a strong negative relationship between the variables. Therefore, if the WIBOR 3M interest rate is increased, the value of total interest-bearing liabilities will decrease. For the second pair of variables, the Pearson correlation coefficient was -0.75, which also means a strong negative correlation between the variables tested. There was no correlation between the third pair of variables. The obtained Pearson correlation coefficient of 0.03 indicates that there is no relation between the value of short-term interest-bearing liabilities and the WIBOR 3M interest rate level.

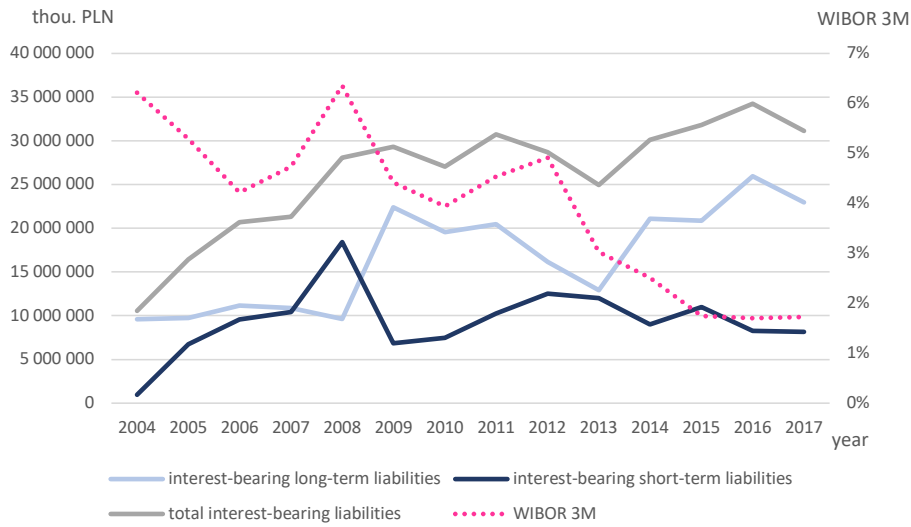


Figure 4. Liabilities vs. interest rates
Source: own study based on the data from the Notoria database and the data from money.pl website

Table 3: Pearson linear correlation coefficient for liabilities and WIBOR 3M

Specification	Coefficient value	Student's t-test	p-value	Statistical significance $\alpha = 0.05$
Pearson correlation – total liabilities and WIBOR 3M	-0.65	-2.9572	0.0119	yes
Pearson correlation – long-term liabilities and WIBOR 3M	-0.75	-3.9727	0.0018	yes
Pearson correlation – short-term liabilities and WIBOR 3M	0.03	0.0926	0.9277	no

Source: own study based on the data from the Notoria database and the data from money.pl website.

The next research step was the analysis of the debt of business entities over the years. For the purpose of this study, the debt ratio is the quotient of the value of total interest-bearing liabilities and liabilities. For each year, the data for 84 entities constituting the research sample were aggregated and subjected to statistical analysis. Out of the statistical measures of the distribution position, the following were used: the arithmetic mean, median, quartile I and quartile III.

Table 4: Measures of the distribution position for the debt ratio of the tested sample

Specification	2004	2005	2006	2007	2008	2009	2010
median	0.00%	0.73%	4.44%	2.43%	7.70%	3.87%	5.53%
average	7.92%	9.26%	11.90%	10.81%	12.16%	11.54%	11.15%
quartile I	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%
quartile III	12.45%	17.67%	24.11%	20.38%	20.98%	20.61%	18.60%
Specification	2011	2012	2013	2014	2015	2016	2017
median	7.69%	9.85%	8.92%	7.90%	9.80%	10.09%	10.96%
average	12.37%	14.15%	11.82%	15.08%	1167.37%	284.65%	21.92%
quartile I	0.08%	1.98%	1.02%	2.00%	2.09%	3.31%	1.89%
quartile III	19.60%	21.04%	18.67%	21.24%	21.72%	23.56%	21.69%

Source: own study based on the data from the Notoria database.

Due to the large diversity of debt ratios for individual companies in one-year periods, the arithmetic mean was excluded from further analysis. Therefore, the median and quartiles were interpreted. The median of the debt ratio for the sample was characterised by a clear upward trend. From the median debt ratio of 0.00% in 2004, there was an increase to 10.96% in 2017. At the same time, the median debt ratio in 2017 presents the highest value for the whole time series. An equally high level of debt was observed in 2012, 2015 and 2016, where the median of the debt ratio stood at 10%. Quartile I for the first six years amounted to 0.00%. Since 2010, there has been a gradual increase in the value of quartile I, which means that the lower limit for the debt ratio has increased. The highest value of quartile I was observed in 2016, where 25% of companies had a debt ratio lower than 3.31%. Quartile III for the surveyed community showed a steep upward trend. It assumed the highest value in 2006 and 2016, where it amounted to about 24%. This means that only in the case of 25% of the companies the coefficient was higher than this level. The lowest values of quartile III were observed for 2004 and 2005, i.e. at the beginning of the time series under analysis.

After analysis of the debt ratios for the sample group, the variable in question was compared with the WIBOR 3M interest rate level, which is presented in the chart below.

Additionally, in order to better illustrate the correlation between variables, the Pearson correlation coefficient was calculated for the median debt ratio and the WIBOR 3M interest rate level.

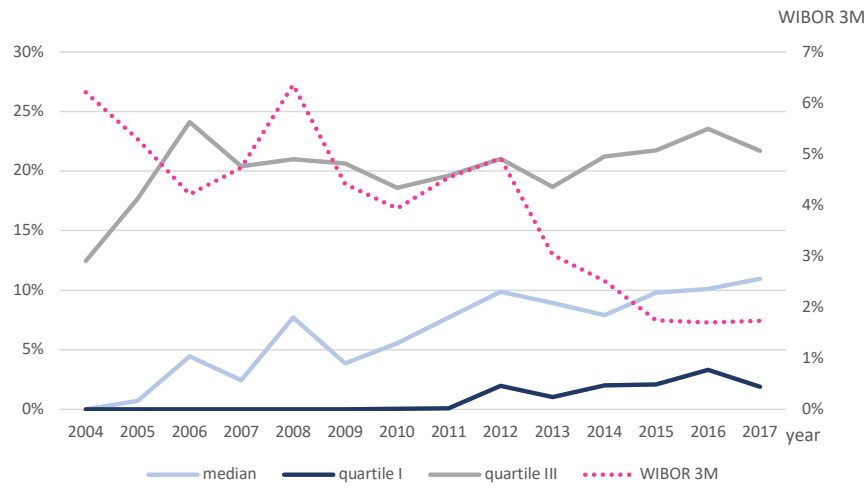


Figure 4. Liabilities vs. interest rates
Source: own study based on the data from the Notoria database and the data from money.pl website

Table 5: Pearson correlation coefficient for the median debt ratio and WIBOR 3M interest rate

Specification	Coefficient value	Student's t-test	p-value	Statistical significance $\alpha = 0.05$
Pearson correlation – debt ratio and WIBOR 3M	-0.67	-3.1463	0.0084	yes

Source: own study based on the data from the Notoria database and the data from money.pl website.

5. Conclusions

When verifying the main objective of the research, it should be stated that there is a correlation between the level of interest rates and the level of indebtedness of Polish listed companies. The level of total interest-bearing liabilities for the selected sample of companies remains in an upward trend, and interest rates in a downward trend, excluding increases in 2008 and 2012, which was confirmed by the strong Pearson correlation, whose coefficient for the examined variables in the whole period amounted to -0.65. It should be remembered, however, that interest rates are the transmission channel of monetary policy, which operates with a time lag. Therefore, it can be concluded that only long-term interest rate decreases have a significant impact on the level of indebtedness of Polish listed companies. The results of the research do not allow us to reject the first hypothesis, which stated that the lower the level of interest rates, the higher the share of interest-bearing liabilities in total liabilities in the research group under analysis over the years 2004-2017. Correlation calculated with the Pearson coefficient showed that there is a strong, negative relationship between the median of the debt ratio and the WIBOR 3M interest rate level. While verifying the second hypothesis, it should also be stated that there are no grounds for its rejection. Over the years 2004-2017, the Pearson correlation for long-term liabilities was -0.75 and for current liabilities 0.03. Thus, in the case of long-term liabilities, there is a strong dependence, whereas in the case of short-term liabilities there is no such dependence. In addition, it is worth noting that the share of current liabilities in total interest-bearing liabilities decreases with the decrease in interest rates. This is best illustrated by the years 2013-2017, where the share of short-term liabilities in total liabilities dropped from 48.24% in 2013 to 26.26% in 2017. Based on the above results, it is concluded that the monetary policy transmission channel under analysis affects the decisions not only of financial institutions, but also of the largest economic entities in the country. Nevertheless, a comprehensive assessment of the effectiveness of the central bank's operations requires further research, which the author is currently pursuing.

References

Baxter, N. D. (1967). *Leverage, Risk of Ruin and the Cost of Capital*, The Journal of Finance, 22 (3), 395-403.

Białek-Jaworska, A., Dzik, A., Nehrebecka, N. (2014). *Wpływ polityki monetarnej na źródła finansowania przedsiębiorstw w Polsce w latach 1995-2012*, Materiały i Studia, 304.

Brown, M., Ongena, S., Popov, A., Yeşin, P. (2011). *Who needs credit and who gets credit in Eastern Europe?* Economic Policy, 26 (65), 93-130.

Caballero, R. J., Hoshi, T., Kashyap, A. K. (2008). *Zombie lending and depressed restructuring in Japan*, American Economic Review, 98 (5), 1943-1977.

Chojnacka, E. (2012). *Struktura kapitału spółek akcyjnych w Polsce w świetle teorii hierarchii źródeł finansowania*, Warszawa: Wydawnictwo CeDeWu.

Damodaran, A. (2007). *Finanse korporacyjne. Teoria i praktyka*. Gliwice: Wydawnictwo Helion.

Egert, B., MacDonald, R. (2009). *Monetary transmission mechanism in central and eastern Europe: surveying the surveyable*, Journal of Economic Surveys, 23 (2), 277-327.

Fisher, I. (1930). *The theory of interest*, New York: The Macmillan Company.

Forbes, K. (2015). *Low interest rates: King Midas' golden touch, London: Speech at The Institute of Economic Affairs*.

Ghosh, S. (2010). *Firm characteristics, financial composition and response to monetary policy: evidence from Indian Data*. Journal of Indian Business Research, 2 (4), 198-215.

Klepacki, J. (2016). *Ryzyka polityki ujemnych stóp procentowych*, Finanse, Rynki Finansowe, Ubezpieczenia, 4 (82), 721-728.

Łach, K. (2012). *Wpływ stopy procentowej na strategie finansowania przedsiębiorstw w Polsce, doctoral dissertation*, Kraków: Uniwersytet Ekonomiczny w Krakowie.

Muthama, C., Mbaluka, P., Kalunda, E. (2013). *An empirical analysis of macro-economic influences on corporate capital structure of listed companies in Kenya*, Journal of Finance and Investment Analysis, 2 (2), 41-62.

Narodowy Bank Polski (2018). *Instrukcja dla użytkowników statystyki stóp procentowych*, Warszawa: Departament Statystyki NBP.

Piłatowska, M. (2008). *Repetytorium ze statystyki*, Warszawa: Wydawnictwo Naukowe PWN.

Powell, J. H. (2017). *Low Interest Rates and the Financial System: a speech at the 77th Annual Meeting of the American Finance Association, Chicago*, Illinois, January 7, 2017, No. 931, Board of Governors of the Federal Reserve System.

Pułaska-Turyna, B. (2011). *Statystyka dla ekonomistów*, Warszawa: Wydawnictwo Difin.

Pyka, I., Nocon, A. (2016). *Dynamics of lending activity of polish banking sector towards low interest rate policy of central banks*, Transformations in Business & Economics, 15 (2A), 415-433.

Rzońca, A. (2014). *Kryzys banków centralnych: skutki stopy procentowej bliskiej zera*, Warszawa: Wydawnictwo CH Beck.

Szydłowski, K. (2017). *Wpływ polityki monetarnej na strukturę kapitałową przedsiębiorstw w Polsce*, in: Wieteska S., Czechowska I. D., ed. 2017, *Granice finansów XXI wieku*. Bankowość i ubezpieczenia, Łódź: Wydawnictwo Uniwersytetu Łódzkiego.

Woźniak, M., Lisowski, R. (2017). *Stopy procentowe NBP a wartość kredytów bankowych dla przedsiębiorstw w Polsce*, in: *Metody ilościowe w ekonomii*, Studia i Prace WNEiZ US, 50/2, 163-175.

E-resource: Access: https://wibor.money.pl/

E-resource: Access:

https://www.nbp.pl/home.aspx?f=/statystyka/pieniezna_i_bankowa/oprocentowanie.html

Creative Commons Attribution-NonCommercial 4.0 International Public License
https://doi.org/10.18559/ref.2018.2.2

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

Why and how healthy enterprises invest in distressed companies? Theoretical background of motivation and market statistics of distressed investments on global M&A market

Mateusz Mikutowski[1]

[1] Poznan University of Economics and Business, Poland

ABSTRACT

The utilisation of opportunities by enterprises as the main factor in their development has been the subject of many researchers' deliberations in recent years. In the author's perspective, the processes of mergers and acquisitions, in particular, related to investments in distressed assets are a very clear reflection of the strategy of entrepreneurial opportunities utilisation in both passive and creationist approaches. In this paper, the author tries to identify areas where the theory of entrepreneurial opportunities as a part of management studies are reflected in mergers and acquisitions operations. By applying distressed asset investments to the theory of entrepreneurial opportunities, a more in-depth understanding of the motivation of enterprises to make mergers and acquisitions is possible. Additionally, by referring to market practice and empirical research, the author intends to present arguments that allow combining the elements of the leading theories concerning management through opportunities, and this type of investment is a crucial part of modern company management strategy.

Keywords: opportunities, mergers and acquisitions, strategic management, competitive position, non-performing assets.

1. Introduction

The contemporary competitive environment is undoubtedly very specific. Most industries operating in the economy are characterised by high volatility of conditions prevailing in it and a high level of competition. This state determines that companies must utilise every opportunity to overtake their competitors. An actively developed contemporary trend in strategic management is entrepreneurial opportunities utilisation. Undoubtedly, such a business model has a justification for both theoretical and practical fields.

In this paper, the author presents the most important theories on building a competitive position by enterprises and the concept of an entrepreneurial opportunity. Next, the author explains the concept of distressed assets and depicts the basic strategies for investing in these specific assets on the mergers and acquisitions market. In part three the author tries to show the reflection of theoretical considerations about entrepreneurial opportunities in practical activities of merger and acquisition processes. The last part is an empirical study conducted by the author on the mergers and acquisition market, where the author tries to measure distressed M&A deals activity and characterise it in view of the considerations from part three.

2. Creating a competitive position by enterprises

Competitiveness is defined in a very different way depending on the perspective and the authors of definitions. One of the most commonly cited definitions of building a competitive advantage in the scientific works is the definition proposed by Porter (2001), who claimed that the main factor determining the emergence of a competitive advantage in the company is the level of innovation that increases efficiency in the company and the use of production factors. Porters' definition focuses on the efficiency and the growth of opportunities

in enterprises. However, many researchers argue that innovation is not necessary in order to build a competitive advantage, and for specific situations and types of enterprises it is not the most effective way to achieve a sustainable competitive advantage. Wennkers et al. (2005), in their work, even showed a negative correlation between innovation and business results.

It is well known that the attempt to achieve innovation is time-consuming and capital-intensive. For this reason, it is not always necessary to be the first and most innovative company to be the most successful on the market. The answer to the non-treatment of innovation as a universal solution is, inter alia, the imitation strategy – an approach that allows a company not to stand out from its competitors, while not incurring high costs for research and development. This strategy is often used by enterprises with weaker market positions (Filipiak, 2000, p.77). Contrary to appearances, imitation is also not an easy strategy to implement in a company, because it requires quick and creative actions, and over time can even become a prerequisite for executing the leading strategy (Marek & Białasiewicz, 2011, p. 106).

Many definitions of the competitive advantage are focused on the concept of the entrepreneur – the client, which does not completely correspond to the subject of this paper. In terms of investments made both by entities strategically (strategic investments) and by enterprises dealing with investments professionally (financial investments), a well-tailored definition is that presented by Penca (1999, p. 240), which defines the competitive advantage as: "the degree to which the company has mastered the crucial success factors in the market".

This definition can be considered as not very precise, but according to the author of the paper, thanks to its universality, it makes it possible to refer it to the concepts described in the paper.

A competitive advantage can be built in many ways; depending on the industry, there will be completely different factors crucial to be successful in one. In production companies, it will be production efficiency and distribution methods, in the e-commerce industry, appropriate advertising and positioning, in the IT industry, technologies and patents, and the private equity investment fund will in most cases look at the scalability and growth potential of purchased companies. Not every industry requires innovation, but in every industry, one should gain an advantage over competitors in the most important areas for the market whose member it is.

This paper does not try to seek the answer to the question of which factor is decisive for the development of the enterprise, because there is no one universal answer in this case. The company should achieve previously assumed goals, which are often broadly understood as development. The opportunities in the market are undoubtedly a way to accelerate the pace of development and overtake companies' competitors for the next step, and thus, increase their competitive position.

2.1. The concept of entrepreneurial opportunities

The concept of entrepreneurial opportunities in business processes has been the subject of considerations of scientists dealing with management studies for many years. Venkataraman (1997) stated that the main field of activity for an enterprise should be searching for the reason, time and manner of appearing on the market. Currently, there is no one universal definition of entrepreneurial opportunities. According to the study by Hansen et al. (2011), definitions differ from one another with a fundamental approach to this phenomenon.

Some describe the utilisation of entrepreneurial opportunities as a process of development, others as a process of searching and alerting to them. They are also described as binding supply and demand or as a creative process. One of the researchers who undertook to organise this problem is Krupski. According to the definition presented in one of his papers, utilising the entrepreneurial opportunity is: "subjective giving the occasion an event (it may be a combination of circumstances) with the intention of using its potential to achieve above-average effects (economic, social, political), an event that rarely occurs and irregularly (randomly), it is ephemeral [...]" (Krupski, 2011). A similar approach to this concept is also shared by other researchers who define an opportunity as something immaterial, something that cannot be observed and is rather a social construction that was created through the existence of a relationship between the company and its environment (Koellinger, 2008; Edelman & Yli-Renko, 2010).

2.2. Types of entrepreneurial opportunities

The entrepreneurial opportunity is a very wide concept. According to the analysis of theoretical considerations, and as it later turns out after referring to practice, an opportunity is very fluid and its occurrence depends not only on the company's strategy towards them but also on the company's industry or macro-

economic conditions. It is not surprising that for some businesses an entrepreneurial opportunity means something completely different than for the others, which determines different approaches to the occasion depending on the perspective.

One proposition for categorising opportunities was proposed by Alvarez and Barney (2007), as well as Vaghley and Julien (2010), who analyse opportunities from two perspectives: classic, where it is understood as an objective entity that managers need to discover and search before others (Kirznerian, 1997). In the second perspective, managers need to create opportunities on their own through an innovative approach – this is the creationist approach (Schumpeter's approach). A large number of researchers postulate that only one of the analysed approaches is the correct concept, but the author of this paper opts for the approach proposed by Shane and Venkataraman (2000), as well as Shane (2003), who postulate that both perspectives for seeing entrepreneurial occasions are correct and can co-exist with each other on a given market/environment at the same time. The author agrees that each shot is correct in its own way and depends on the situation in which a given value occurs. Krupski (2011) divided the opportunities into types due to the source of entrepreneurial opportunities and the subject's approach to the occasion, demonstrating possible interdependence of both types of opportunity sources. Figure 1 shows its conclusions as a matrix:

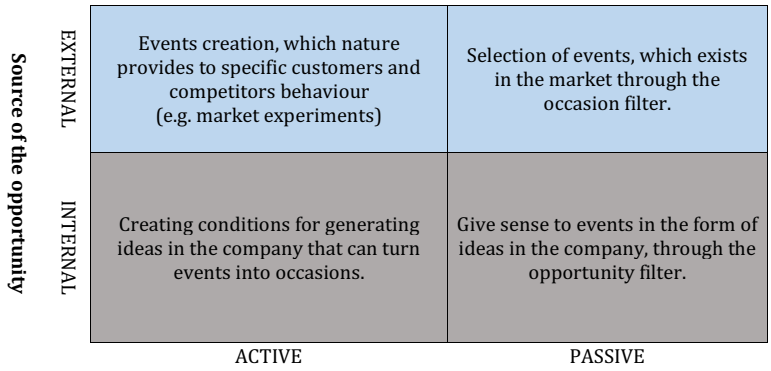


Figure 1. Opportunities as a source of origin and the company's approach to the occasion
Source: Based on Krupski (2011, pp. 11-24)

After all, an enterprise can utilise opportunities to enforce market opportunities in a twofold way. This proposition perfectly reflects examples showed in this paper about the perspective of capital investments on the merger and acquisition market examined by the author.

3. The concept and perspectives of distressed assets

There are countless motives for conducting mergers and acquisitions processes. Among the most popular ones, it is possible to indicate the desire to increase sales, conquer a new market, obtain technology or reduce competition in a given country. In this paper, the author describes the type of investments that can successfully fulfil all of the above objectives, but they are characterized by a rather unusual approach to the selection of potential assets/companies acquired, having in mind – investments in distressed assets. They are one of many types of value investment strategies, but they are characterized by a rather extreme approach to seeking the source of the value.

At the outset, it is necessary to define what kind of assets is described and referred to as the most frequently appearing misunderstandings of distressed assets. Sometimes distressed assets are equalised as assets of increased risk or just as non-performing assets. According to the original meaning, these are not precise definitions. First of all, the definition of high-risk assets must be separated from the definition of distressed assets. High-risk assets can, in fact, mean any category of high-risk assets, so in addition to the distressed assets mentioned above, also venture capital fund investments in companies at the initial stage of development or alternative investments such as an invest-

ment in arts or collector's cars. The second frequently used definition is the concept of non-performing assets, which is closer to the original meaning, but in this case, the threat can also be received in a very wide way. The original meaning is not about the threat of theft or destruction, but the financial or operational risk associated with them.

If recognized in relation to the equity, a distressed company is a type of company that is in a difficult financial or legal situation, which results in devaluation of its assets compared to a situation in which this company would be a properly functioning organisation. The reasons for this situation may be sought in several areas:

a) The need to instant liquify the assets of an enterprise or a whole company for:
- saving the remaining part of the business of the owner or capital group,
- the desire to avoid legal and financial consequences by the managers of the bankrupt company,
- saving the image of the owners or managers towards stakeholders (employees, the public, the state).

b) Bidding on the assets of the enterprise or the entire enterprise by creditors to recover debts. In such situations, the commonly achieved price is lower than the price for similar assets (similar in the meaning of internal condition) in other external conditions. Usually, when it comes to auction, it means that at an earlier stage there was no willing to invest in the company. For this reason, the price may be more attractive to buyers.

c) Consequences of violating legal regulations – state authorities may force to conduct a merger or takeover of a given company, e.g., a bankrupted bank can be forced to be acquired to a larger entity in order to save the stability of the banking system and the savings of depositors.

As a result, investments in non-performing assets are of high risk, but what makes them attractive to investors is caused by a discount for the risk of bankruptcy or financial/legal issues of a given company/holding/owner.

For the purpose of this paper, investments in distressed assets are analysed from two perspectives:

1) Performed by strategic investors – as mergers and acquisitions made by the same or similar industry entities. The subject of the takeover in the case of investments in distressed assets will most often be a direct competitor, but an acquisition involving horizontal or vertical integration is also possible.

2) Performed by financial investors – these are acquisitions performed mostly by private equity funds, which have as one of the elements in their investment strategy or as the main motive in their activities the tactic of taking over entities in a difficult financial or operational situation. As part of the investment of private equity funds, one of two types of scenarios is most often implemented:

1. Investments targeted at restructuring activities in the acquired enterprise. The investment company has specialists in the area of crisis management, operational and financial restructuring. As part of its activity, it conducts corrective actions aimed at restoring the enterprise to correct the operational and financial condition, which increases its market value. Then, the fund resells a healthy enterprise to another fund or strategic investor, realising a profit. It is also possible to provide debt financing, where the risk is reflected in a high-interest rate.
2. Investments aimed at liquidation – an investment fund focuses on the company's assets by seeing the liquidation value in it. The fund invests in the company claiming that due to the discount related to the difficult situation of the company, the internal value of the company's net assets is higher than the purchase price increased by the liquidation costs.

4. Investments in distressed assets as an opportunity

Opportunities are very often indicated as one of the most important motives for mergers and acquisitions (Frąckowiak, 1998. pp. 18-22). It is a motivator to undertake such activities for many enterprises, which until the appearance of a market opportunity in the form of a bankrupting competitor did not even think about entering the acquisition market. And what if the opportunity of an investment company would make the main area of its activity? Only how can a company base its main activity on a phenomenon it cannot foresee? The author will try to answer these questions later in the paper.

In order to start further reflections on the companies' utilisation of management theories through entrepreneurial opportunities, the author decided to refer to the mentioned matrix created by Krupski in terms of capital investments and financial strategies of enterprises. From the perspective of the theory of corporate finance, the aforementioned matrix is identical to the way of presenting the directions of enterprise development, which is usually divided into external and internal motives (Romanowska, 2000, pp. 149-150). The internal ones are those that are associated with organic growth. The author of this paper focuses on the me-

thods of external development, which are related, inter alia, to mergers and acquisitions. For this reason, it was decided to analyse only the occasions that have an external source because that is what companies in the acquisition market are facing.

4.1. The utilisation of entrepreneurial opportunities by strategic investors: passive approach

The first of the discussed methods of taking over strategic investors is a passive approach to this type of investments. Mergers and acquisitions are very risky, labour-intensive and expensive. For this reason, they are relatively rarely the main strategy for company development, especially those smaller or risk-averse enterprises. Only a minor part of enterprises have M&A transactions implemented into their long-term development strategy. However, it often may turn out that entities are not aware that they could make such a strategic decision until the opportunity arises.

A situation where the owner of a competitive company, due to the lack of successors or the desire to move to early retirement, expresses the will to sell a healthy and prosperous business, may also be considered as an opportunity. However, a much stronger incentive and greater advantage will appear in a situation where a competitor has fallen into financial problems and is forced to sell their business to save their and their whole family's property, other businesses or a good reputation. In this case, the opportunity is stronger than in the previous example. This is in line with the theory of the expected value presented by Shane and Venkataraman (2000) and its modification proposed by Krupski (2013), who postulates that the incentive to take advantage of a bargain purchase is all the greater, the value of the benefits of a potential transaction will be higher than the standard expected value for most transactions or activities. An entrepreneur who decides to take over a failing company may fulfil their previous strategic assumptions (increase in sales, acquiring technology, entering a new market, etc.) in a way that they did not previously plan, however, faster or cheaper compared to the organic growth.

In this way, a passive approach to external events is reflected, in other words, in line with the Kirznerian approach. When undertaking an analysis of the described entrepreneurial opportunity, the entrepreneur must identify its occurrence in the first stage. Of course, they may be informed by the seller or the market itself, but this is not necessarily the case. Then, in a suitable way, they should analyse a potential investment to determine if it is profitable. Subsequently, they should prepare an action plan for the implementation of a given investment. Finally, which is perhaps the most important, they should not be overtaken by another competitor concerned.

The information presented in the previous sub-chapters shows that the company cannot fully prepare to take advantage of the opportunity, because in the passive approach opportunities are unexpected and difficult to predict phenomena. However, a company may be prepared that such a situation may hypothetically occur and create an action plan that will allow competitors to overtake or obtain financial resources necessary to make a purchase if such an occasion occurs. Then, the company is moving towards an active approach to entrepreneurial opportunities. Some organisations are not able to respond quickly enough to an emerging opportunity and lose it forever. In this case, at best, they will not gain an increase in the efficiency of their operations, in practice, it will probably be utilised by a competitor and in addition to lost profits, the company will also lose some of its competitive advantages.

4.2. The utilisation of entrepreneurial opportunities by strategic investors: creationist approach

On the other hand, one should look at the active, creationist approach to the occasion (Schumpeter's perspective) in the context of mergers and acquisitions. The creationist approach in merger and acquisition transactions is certainly less intuitive than in the case of the passive approach – but it is possible, which has been confirmed many times in practice. Krupski (2011) points out a similar approach, in which he describes stock market situations, where large players lower the share prices of competitors using the available funds. According to the above, companies can themselves provoke the market for sale, either directly or indirectly.

In a situation where a competitive company is in a difficult financial situation, but its owner does not want to sell his business to an outside investor, a less ethical competitor may appear and decide to force a bankrupt company to sell his property. Having information that a given company is in poor condition may decide to make a hostile takeover (usually when the target is a public company). Most defence tactics against hostile takeovers require a lot of capital and other non-financial resources. In a situation, where the company is not doing well even in its standard operations, defending against a well-prepared hostile takeover can be very difficult. For this reason, companies thre-

atened with bankruptcy are a very good goal of such actions, so the buyer may not care about another future vision of the initial owner of the company and simply force them to exit the investment.

In the case of private enterprises, rather unfriendly to hostile takeovers, even less ethical activities may be involved. A potential solution may be to bring the selected target into a difficult financial situation, through dumping or other more or less in-law market activities. Achieving the assumed goal, in this case, is easier while the condition of the potential target is more complicated. When a position of a potential target is bad enough, then the buyer can "help" by acquiring the bankrupting company. It is also not ethical at all, but a kind of creating opportunity.

In most cases these activities may not be considered or are incompatible with business ethics, however, they are very common in business practice. What is heartening in terms of business ethics, is the information that statistically, in most cases, investments in distressed assets are friendly takeovers rather than the hostile ones (Fealten & Vitkova, 2014), but this does not mean that the latter does not exist in practice.

4.3. The utilisation of entrepreneurial opportunities by financial investors

In the case of private equity funds, similar conclusions may be drawn as in the case of investments in this type of distressed assets made by industry investors. Private equity funds, even those not specialising in the direction of investments in distressed assets, can invest their capital in a bankrupting or bankrupted enterprise in order to restructure it if the right opportunity arises and it is not inconsistent with their investment policy. Broadly understood private equity funds, in this case, use the passive approach and make such investments when the opportunity arises. Sometimes, referring to hostile takeovers described in the previous sub-chapter, they can act as a "white knight" who helps defend against the hostile takeover of a company threatened with it.

However, a more interesting aspect that can be analyzed in the context of exploiting market opportunities, are specialised private equity funds that only invest in distressed assets. It is not hard to think that their business model is based on management by utilising entrepreneurial opportunities. The only question is if it was their standard, expected business model, then can we continue referring to investments in bankrupted enterprises as occasions? This is an approach inconsistent with the model presented by Krupski (2013), where it is described that an opportunity is more attractive when its expected value is higher than the majority of transactions or activities carried out by a given entity, yet this type of an investment fund assumes in its standard business model that such opportunities will occur and will allow entities to make a profitable investment.

However, according to the author of this paper, an entity specialised in this type of investment is, in fact, an extreme case of managing by utilising entrepreneurial opportunities. The model proposed by Krupski, while analysing this type of entities, is accurate when it comes to their passive approach to the emergence of opportunities in the form of corporate bankruptcies. Distressed funds await the emergence of similar situations on the market and rather they do not evoke them according to the methods described by the author in the previous sub-chapter, because in most cases such activities are not in line with their interests. What makes the approach of distressed funds considered as a strategy based on management by utilising opportunities is their preparation for converting fallen enterprises into occasions.

Such funds have a whole staff of people who are specialists in many areas of activity related to, among others with restructuring law, optimisation of sales or production, management of liquidity, liquidation of enterprises or, if they do not have appropriate competencies in more specialised areas, they support themselves by using outsourcing services. Distressed funds due to the "occasionality" of similar investment opportunities are unlikely to be specialised in the industry or business models and must actively seek this type of investment and potential ways to restore the splendour of the acquired enterprises.

For this reason, distressed funds really create opportunities for a profitable investment. For many private equity funds, companies threatened with bankruptcy are completely unattractive, and investing in them would be a complete disaster for them. However, distressed funds, through their specialisation and unique know-how are able to record high yields by investing in companies that for many other market participants would be only a superfluous problem.

5. Characteristics of M&A distressed investments: empirical studies

In the case of a classical approach to mergers and acquisitions, bargain purchase may occur suddenly and unexpectedly, and an entity interested in it must respond quickly enough

to take advantage of the potential opportunity to utilise a competitive advantage. On the other hand, some companies may be useless or require some more actions to make it possible to invest in them at all, but a creative manager may find a way to use the assets in an unusual way, and thus benefit by creating entrepreneurial opportunities. Kernami and Wernerfel (1985), in their paper, look for opportunities in aggressive behaviour towards competitors, in which they exchange acquisition activities, among others.

In order to verify the actual market activities in the area of distressed assets, the author analyzed the merger and acquisition market. The author undertook the verification of distressed investments in the perspectives described in the previous chapter: as investments conducted by strategic and financial acquirers. Unfortunately, it was impossible to verify the motivation of investors, which is undoubtedly important, but difficult to measure. For this reason, the motivation is presented and discussed in a theoretical manner in the previous part of the paper.

Information about M&A transactions was downloaded from the Thomson Eikon database, a global, professional database of capital market transactions including mergers and acquisitions (private and public deals). The author has chosen to analyze all transactions conducted between the years 2015-2017. The database contained 155 765 records about transactions from around the world. For the purposes of robust statistics, the author filtered the database using the following criteria, which are presented in table 1.

Table 1: The process of selection of transactions

Filter	Number of records meeting the single requirement	Number of records on a given step
Transactions announced in 2015-2017	155 765	155 765
Transactions marked as "completed"	109 452	109 452
Transactions with revealed EV/EBIT multiple	14 966	9 882
Transactions with negative EV/EBIT multiple	5 746	3 689

Source: own study based on the Thomson Eikon database.

A crucial step for the following analysis is the last one – choosing only transactions with calculated negative EV/EBIT multiple. The author uses this information as a proxy of distressed asset investments. It is not a perfect proxy, because negative EV/EBIT multiple is sometimes the result of wrong data or specific accounting policy, but in the author's view, it is the best proxy available in the current M&A datasets.

Table 1 shows that above 1/3 of all transactions fulfilled the requirements of distressed investments. It means, that above 1/3 of all transactions can be characterized as distressed investments and testifies to the relevance of this type of investments.

The most important statistics resulting from the conducted analysis is a type of investors in distressed assets transactions – to verify if the theoretical considerations from the previous chapter have a reflection in practice. For the purposes of this task, the author analysed the assignment of acquirers and divided them into two groups – investment and non-investment companies. Companies connected with financial investors, such as private equity, investments banks, wealth management, investment funds, hedge funds, etc., were classified as investment companies, and the others as non-investment companies. The results of the analysis are shown in figure 2. It turns out that 37% of distressed asset deals are conducted by financial investors, the rest are strategic deals. That observation confirms the theoretical considerations presented in the previous parts of the paper because distressed deals are an important part of the M&A activity for both, investment and non-investment companies.

Another important area to analyse is the sectors of targets in this type of deals. This information is shown in figure 3. It shows industries of companies being acquired in distressed deals. It is clearly visible that technology, industrial sector and production are the most often involved sectors.

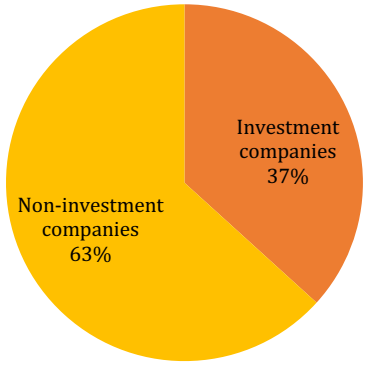


Figure 2. The share of distressed asset deals conducted by investment and non-investment companies
Source: own study based on the Thomson Eikon database

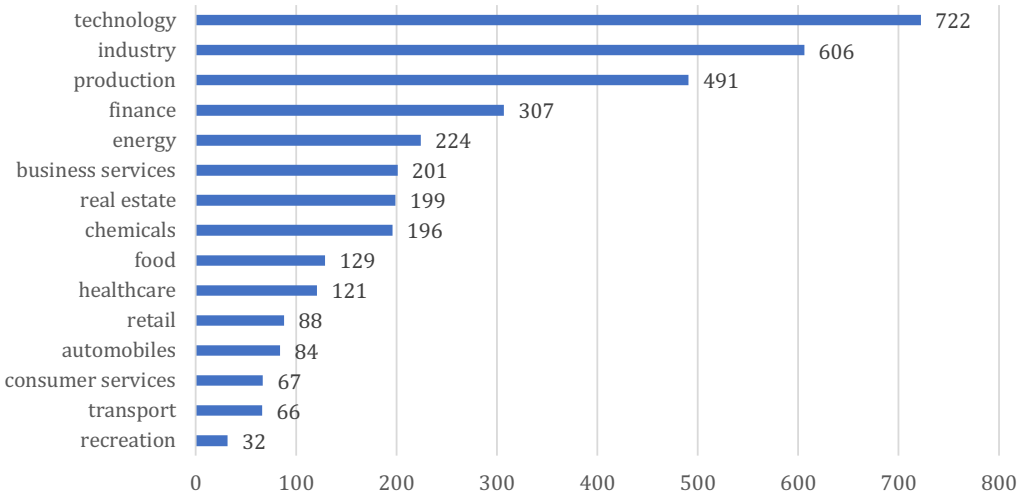


Figure 3. Sectors of targets in distressed asset deals
Source: own study based on the Thomson Eikon database

The author also analysed the regions of undertaken distressed asset investments. Figure 4 presents the regions of origin of the target and acquirers. Figure 3 shows that geographical distribution of distressed deals is very similar to the whole worldwide M&A activity. The most active regions are North America, North Asia and Western Europe – these regions conduct above 75.0% of global deals. (Grobelny et al., 2018, pp. 106-110). There are also no significant differences between target and acquirer regions. The biggest difference is observable in the North American region, where 25.0% of all targets originate, but only 18.0% of all acquirers.

This article is the source of future research in this area. Undoubtedly, significant knowledge could be obtained by analysing such investments in a longer time series, dynamically in the perspective of economic cycles. Another interesting area would be comparing this type of investment with other types of M&A transactions.

6. Conclusion

The behaviour of entities in the mergers and acquisitions market described by the author confirms that an opportunity may have its own spontaneous source and be created by enterprises as a reflection of the creationist approach. In addition, the author would like to draw attention to the fact that much depends on the perspective from which particular occasions are considered. For one company, a given market event may not be an opportunity and for another, it may be a determinant of development for many years. Similarly, in the perspective of market participants, the same situations may be for some occasions originating from an autonomous source (in line with the passive approach), and for some may require creating them, because without any interference in the market they may not be able to afford them. By applying distressed asset investments to the theory of entrepreneurial opportunities, a more in-depth understanding of the motivation of enterprises to make mergers and acquisitions is possible. Additionally, by referring to market practice and empirical research, the author showed that distressed deals on the M&A market are important for both, the strategic and financial investors.

References

Alvarez, S.A., Barney, J.B. (2007). *Discovery and Creation: Alternative Theories of Entrepreneurial Action*. Strategic Entrepreneurship Journal, No. 1. doi: https://doi.org/10.1002/sej.4

Edelman, L., Yli-Renko, H. (2010). *The Impact of environment and entrepreneurial perceptions on venture-creation efforts: Bridging the discovery and creation views of entrepreneurship*. Entrepreneurship: Theory and Practice, 34 (5), 833–856.

Fealten A., Vitkova V., (2014). *Who Gains from Corporate Rescues? Distressed M&A during Four Financial Crises*. Mergers and Acquisitions Center, Cass Business School.

Filipiak B. (2000). *Zarządzanie strategiczne. Narzędzia, scenariusz, procesy*, Fundacja na rzecz Uniwersytetu Szczecińskiego. Szczecin.

Frąckowiak W. (1998). *Fuzje i przejęcia przedsiębiorstw*. Warszawa: Wydawnictwo PWE.

Grobelny, P., Stradomski, M., Stobiecki, P. (2018). *Determinanty aktywności na rynku fuzji i przejęć w Polsce*. Warszawa: CeDeWu.

Hansen, D., Shrader, R. Monllor, J. (2011). *Defragmenting definitions of entrepreneurial opportunity*. Journal of Small Business Management, 49(2), 283–304.

Karnami A., Wernerfelt B. (1985). *Multiple point competition, Strategic Management Journal*, 6, 87-96. doi:10.1002/smj.4250060107

Kirzner, I. M. (1997). *Entrepreneurial discovery and the competitive market process: An Austrian approach*. Journal of Economic Literature, 35(1), 60–85.

Koellinger, P. (2008). *Why are some entrepreneurs more innovative than others?* Small Business Economics, 31, 21–37.

Krupski R. (2011). *Okazje w zarządzaniu strategicznym przedsiębiorstwa*. Organizacja i Kierowanie, 4 (147), 11-24.

Krupski R. (2013). *Rodzaje okazji w teorii i w praktyce zarządzania*, Prace Naukowe WWSZiP, 21 (1), pp. 5-16

Marek S., Białasiewicz M. (red.) (2011). *Podstawy nauki o organizacji. Przedsiębiorstwo jako organizacja gospodarcza*, Warszawa: Polskie Wydawnictwo Ekonomiczne.

Penc J. (1999). *Strategie zarządzania. Strategie dziedzinowe i ich realizacja. Zintegrowane zarządzanie strategiczne. Strateging i uczenie się przyszłości. Czynniki sukcesu firmy*. Polsko-angielski słownik stratega, Warszawa: Agencja Wydawnicza Placet.

Porter, M.E., (2001). *Porter o konkurencji*, Warszawa: PWE.

Romanowska M. (2000). *Strategie rozwoju i konkurencji.* Warszawa: CIM.

Shane, S., & Venkataraman, S. (2000). T*he promise of entrepreneurship as a field of research*. Academy of Management Review, 25(1), 217–226.

Shane, S. (2003). *A general theory of entrepreneurship*. Glos, Northampton: US Edward Elgar Publishing.

Vaghely, I., Julien, P. (2010). *Are opportunities recognized or constructed? An information perspective on entrepreneurial opportunity identification*. Journal of Business Venturing, 25, 73–86.

Venkataraman, S. (1997). *The distinctive domain of entrepreneurship research*. in: J. A. Katz (Red.), A*dvances in Entrepreneurship*, Firms Emergence and Growth, 3, 119–138.

Wennekers, S., van Stel, A., Thurik, R., & Reynolds, P. (2005). *Nascent entrepreneurship and the level of economic development*. Small Business Economics, 24, 293–309.

Creative Commons Attribution-NonCommercial 4.0 International Public License
https://doi.org/10.18559/ref.2018.2.3

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

The reputation of the biggest donors of official development assistance

Marcin Leszczyński[1], **Aleksandra Anna Rabczun**[2]
[1,2] Poznań University of Economics and Business, Poland

ABSTRACT

The global crisis of trust has led to a shift in the paradigms of shaping competitiveness. The states as entities of global competition, in times of growing demand for trust, conduct activities in various areas in order to build their position in the world. One of these tools is international public relations and its specialisation, which is the country's social responsibility. One of the most important tools of social responsibility of the country is the official development assistance (ODA). The aim of this article is to verify the role of the social responsibility of the state in shaping the reputation of the largest donors of official development assistance.

Keywords: country's reputation, international public relations, country's social responsibility official development assistance, donors.

1. Introduction

The last decades of the 20th century and the beginning of the 21st century brought many changes in international relations. This is a consequence of globalization and indepth internationalisation of modern international relations (Zajączkowski, 2006). The problem of the increasing disproportion between developing and developed countries has been very popular in international discourse. An expression of this is the deep involvement of many countries in both: the discussion on possible ways to overcome or at least mitigate the effects of underdevelopment, as well as the actions taken in that direction (Andrzejczak, 2011). Development economics is a discipline related to the development of less- and medium-developed countries (Legiędź, 2013). However, it deals not only with economic indicators or economic growth. The most important issue is the improvement of social potential done by, for example, investing in the area of health, education or better public safety (Bell, 1987). Development economics as an area of study became important after the Second World War. However, its main assumptions have been evaluated during the years due to changes in the world and state economies (Piasecki, 2007). In the 1980s, one of the most important modifications of the neoclassical model took place. It was done as a result of the recognition of new market failures. Stiglitz paid attention to the problem of information asymmetry in economics. The information asymmetry had an influence on decreasing competitiveness of developing economies on the international market and gave them worst position compared to developed economies (Stiglitz,1989).

Furthermore, modern economies must face also other kinds of problems. One of the most important issues is the global crisis of trust[8].

[8] Global crisis of trust – a process of reducing public trust in the government, media, business and non-governmental organizations. More on the subject: Edelman, 2017, *Edelman Trust Barometer – trust in crisis*.

The main consequence of the global crisis of trust is the change in the paradigms of shaping processes in the global economic life. This situation also applies to countries that have become part of the global competition. The growing demand for trust among global public opinion, which includes, among others, investors and consumers, has contributed to increasing the role of reputation and credibility in shaping the decision-making processes of these entities. As W. Olins (2000) and M. Mazzucato (2011) note, there are more and more connections between the state and the private sector, which leads to a change of roles between the state and the enterprise. W. Olins (2000) refers to the similarities in the activities of states and enterprises, which are mainly visible in the area of communicating with partners. On the other hand, M. Mazzucato (2011) undermines the conviction promoted in the public discourse that the minimal involvement of the state, limited only to ensuring the free operation of the private sector, is appropriate for the development of innovation. This is a consequence of the image of inefficient public administration functioning in public opinion and the dynamic private sector operating in competitive conditions. As previously stated, the modern state also operates under competitive conditions. This is a consequence of processes such as globalization, mediatisation and democratisation. In this light, the competitive potential and position of the country can support the functioning of the private sector and contribute to its success in the global market. Although M. Mazzucato writes mainly for innovation, it should be noted that the state can support the private sector in many other areas, such as seeking out markets in the global area and inflow of investments. In the era of the global trust crisis, one of the factors determining the success of the state in these areas is its reputation.

Developing cooperation between countries is treated as an important factor in the foreign policy of the state. Commonly, we used to say that the rich global North helps the poor global South[9]. Development policy has different goals to meet – they have both economic and political, as well as social dimensions (Zajączkowski, 2006). Theoretician and practice experts underline that official development assistance contributes to the stimulation of trade between donor and recipient countries (not only in the context of goods but also services). For such a situation, some conditions must be fulfilled, like historical, political, economic and cultural presence of the donor countries in the recipient countries of ODA (Zajączkowski, 2006).

The authors of this study have conducted research to check if there is any connection between the amount of ODA given to developing countries and the worldwide reputation position. The general view is that the countries which are most developed and have the highest GDP (for example, the USA, Germany, Japan) are also the largest donors in the provision of official development assistance (ODA). At the same time, it is worth checking the position of such countries in the reputation ranking. The years 2000-2015 shall be considered as the period of study. Choosing 2000 as a starting year is connected with the Millennium Summit (6-8 September 2000), during which the United Nations countries signed the Millennium Declaration and set the Millennium Goals. They should have been reached by 2015. The explanation of the end year of the research is also connected with the available database.

The analysis is divided into three parts. In the first part, the authors check how much economically strong countries spend on ODA (in millions of USD). Accordingly, the authors present a table with the biggest global donors of official development assistance in 2000-2015. Next, the same countries are checked in the context of a percentage of the Gross National Income (GNI) spend on ODA (presented in the table). A method to choose the leaders is the average of ODA/GNI interest. The authors are aware of the disadvantages of such an approach, but it is widely used in literature and practice. The last part of the research presents the position of global donors in the Country RepTrak ranking. In order to check the relationship between the size of development assistance and the reputation of states, the Pearson correlation coefficient will be applied. That approach will be used to draw a conclusion concerning the existence of a connection between the amount of ODA and reputation.

2. Definition and forms of Official Development Assistance

We can assume that official development assistance is a tool for achieving economic growth and development in developing countries (Andrzejczak, 2010). The Organization for Economic Cooperation and Development (OECD) has developed a definition of official develop-

[9] The poor global South – a common term for poor African, Asian and Latin American countries. The difference between them and the rich global North is not only the GDP per capita but also shorter life expectancy, access to education and public health sector, level of illiteracy and other social indicators.

ment assistance[10], which is widely adopted in literature and practice. A special entity of the OECD – known as the Development Assistance Committee – defines ODA as flows to countries and territories placed on the special list[11] and multilateral institutions. Furthermore, there are additional criteria, such as:
- the flow must be provided by an official agency of the donor country, i.e., by a local government or by their executive agencies,
- it must be administered with the promotion of the economic development and welfare of developing countries as the main objective for the flow,
- it must be concessional in its character, which means that it should convey a grant element of at least 25% of the entire flow.

Such a definition has been adapted by many authors to specific conditions of donor countries. W. Easterly, a famous researcher specialising in development economics, claims that development assistance can be considered as money, advice and conditions provided by rich nations and international financial institutions (such as the IMF[12] or the World Bank), which is designed to achieve economic development in poor nations (Easterly, 2007). For him, it is obvious that economic growth translates into social improvement.

According to C. Lancaster, development assistance is a transfer of concessional resources, usually from a foreign government or international institutions to a government or non-governmental organization in a recipient country (Lancaster, 1999). The reasons for sending flows may be different: diplomatic, commercial, cultural or just developmental. It is commonly used to fund expenditures that further development (or just justified by that) in the country receiving the aid. In fact, most of such assistance has been used for financing discrete investment projects, like building roads, hospitals, schools and so on (Lancaster, 1999).

P. Deszczyński offers the closest approach to DAC OECD's definition in Polish literature. He understands official development assistance flow as:
- a donation of at least 25%,
- expenditure of the public finance sector[13],
- a donation supporting economic growth and social development in developing countries,
- a donation given to countries mentioned in special DAC ODA Recipients list[14].

The same author offers classification of official development flows. Official development assistance can be divided according to a number of criteria, such as the source of origin, form, degree of freedom in using resources and purpose (Kopiński, 2011). Due to the source of origin, it could be distinguished as bilateral, multilateral and private assistance. Bilateral means that there is a direct connection between the donor country and the recipient country. This kind of assistance is given to reach specific development goals. Therefore, it stands out as assistance for specific sectors of the economy, for example, education, health, safety, as well as general assistance given, for example, for improving infrastructure (Andrzejczak, 2010).

If the flows come to the recipient country thanks to international organizations, it is a multi-lateral channel. From practice we know that the most important institutions in the context of providing ODA are the United Nations (UN), the World Bank, the International Monetary Fund (IMF) and the European Union (EU) (Andrzejczak, 2010). Private assistance does not count as official development assistance. It consists of private flows, charitable donations and funds from philanthropic organizations (Kopiński, 2011). Due to the form of providing funds, we can distinguish financial, material and technical assistance. Such classification is similar to the approach given by E. Latoszek, which is presented below.

Considering the criterion of the degree of freedom in using ODA, we can see that there is untied aid and tied aid. The former does not cause any relations or connections between countries. It is the most preferable form of ODA. All countries (at least in theory) try to avoid tied aid, claiming that it is less effective and raises moral doubts (Kopiński, 2011).

The last classification concerns the criterion of purpose. Assistance can be divided into project aid and program aid. P. Deszczyński (2011) describes the first category as support given to make a specific investment in some sectors of

[10] Available at: http://www.oecd.org/dac/stats/officialdevelopmentassistancedefinitionandcoverage.htm.
[11] DAC List of ODA Recipients – available at: http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/DAC_List_ODA_Recipients2018to2020_flows_En.pdf.
[12] The International Monetary Fund.
[13] In different countries we understand different institutions as a unit of public financial sector, for example, in Polish classification it could be the institutions mentioned here: https://www.lexlege.pl/ustawa-o-finansach-publicznych/art-9/.
[14] More about P.Deszczyński's approach is available here: Deszczyński P., 2011, Konceptualne podstawy pomocy rozwojowej, Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań and Deszczyński P., 2001, Kraje rozwijające się w koncepcjach ekonomicznych SPD, Wyd. Akademii Ekonomicznej w Poznaniu, Poznań.

the recipient country, e.g., building a school or hospital. In project aid, recipient countries may perform important reforms in any sector of the economy, e.g., changing the pension system. A separate category is humanitarian aid. In general, it entails saving and protecting people during the disasters caused by natural conditions or human activities (Kopiński, 2011). It should be given just in case of an emergency and does not show a lasting character. In terms of this form, theorists and practitioners have many reservations.

Another Polish economist, E. Latoszek represents a significantly different approach. According to her research, official development assistance is a form of the flow for development funds from developed countries to countries considered as less- or medium-developed (Latoszek, 2010). Such a definition covers far more flows than the classical approach, and thus prof. Latoszek's classification of the ODA forms is much different from the OECD scheme, followed by many international authors.

Table 1: Forms of ODA by E. Latoszek

Financial	Material	Technical
donation	consumption good	workshop
credit	investment good	consulting
debt relief	food aid	expertise

Source: Latoszek E., 2010, Pomoc rozwojowa dla krajów rozwijających się na przełomie XX i XXI wieku, Szkoła Główna Handlowa, Warszawa.

3. Official development assistance as a tool for building the country's reputation

Research on the country's reputation is a relatively young issue, especially in the discipline of economics. It may be considered from two main perspectives, i.e. the consumer and the investor perspective. In the case of the former one, a good example is R.D. Schooler's research (1965) from the mid-1960s, which formed the basis for the concept of the country-of-origin effect. It concerns consumer's decision-making in relation to the willingness to purchase products from different countries or regions. This phenomenon applies to both products and services. An ex-ample here can be German cars, Swiss watches or French wines. With the current progress of globalization, this concept could seem out of date, an example of which can be one of the most recognisable products in the global environment, which is Apple's iPhone. Its components are manufactured practically all over the world. That is why today's talks about the so-called brand's country-of-origin effect, which concerns values, quality management systems and business cul-ture related to a given country.

In the case of the investor's dimension, reputation is more related to the assessment of the state's credibility, including its stability, which allows for assessing the risk related to invest--ments in a given country. In the economic life practice, an increase in interest in this issue was visible in the 1990s, when credit rating agencies began assessing the creditworthiness of states regularly. In both cases, there are links between the actions of the state and the private sector. In the first case, the strategy implemented by the state may contribute to an increase in the demand for goods and services from a given country among consumers on the global market. In the sec-ond case, changes in the credibility of the state affect ratings that may have an impact on confi-dence in the enterprises of a given country and the level of inflow of foreign direct and portfolio investments.

States use a range of tools to build their reputation. One of them is the activities of the coun-try in the so-called concept of country social responsibility. It is one of the tools of international public relations and deals with solving global problems. International public relations are the activities of an organization, institution or government whose aim is, based on building relation-ships and communicating with audiences from other countries, building mutual understanding in the international environment and growing global trust (Leszczyński 2018). The United Nations (2018) covers 20 major global problems, including the refugee and migration problem, climate change, peace and security or democracy and human rights. Each of these issues is the main responsibility of states, their societies, and governments.

Based on the results of studies conducted in 2017 (Leszczyński, 2017), it can be con-cluded that countries that are socially responsible enjoy a better reputation in global public opin--ion. An example could be official development assistance, in which the correlation coefficient between its size and the country's reputation was 0.874. On the other hand, in the case of the share of funds for development assistance in

GNI, it was equal to 0.863[8]. In both cases, the correlation is assessed as very strong. Another example is the state's involvement in activities for environmental protection. Research on the state of the environment and actions for its protec-tion by states give grounds for stating that the country's social responsibility in this area is also related to the improvement in its reputation. The analysis of the correlation carried out among the European Union countries (Leszczyński, 2016) shows that the average relationships between the two categories oscillate between 0.56-0.8. The presented data make it possible to state that socially responsible actions of states lead to improvement in their reputation in global public opinion.

4. Global donors of ODA and their reputation

The vast majority of the world's volume of development assistance is passed on by the mem-bers of the DAC. The analysis of spending on ODA may be conducted in two ways. Both ways are broadly used in literature and practice. International statistics concerning development show not only the amount of dollars [9]spend year by year, but also the sum in some periods of time. In the first stage, we can compare the amount of money given to developing countries each year, and in the second – the GNI interest given as ODA. The second approach is more popular in international discourse, since it is more precise as it also shows the donors' economic potential. Spending one million dollars on development purposes by the country like France or the UK is different from Lithuania or Bulgaria. Due to the time range of this paper, the authors decide to sum all flows in the years 2000-2015 and also to check the average percentage of the GNI spend on ODA in the same years.

Based on the previous considerations, it should be noted that the actual amount of aid funds transferred to developing countries is a result of current economic, political and social events in the donor countries. Table 2 presents countries which spend most on development. The authors choose them according to their own research based on the OECD Statistics data-base. Some countries have provided ODA for years, while some have been donors for a rela-tively short time.

Six biggest donors of official development assistance are also the countries with the biggest economies around the world. All of them are united in the G8 group[10]. It proves the assumption that the biggest donors are at the same time the strongest economies. Position no 7 – which is Saudi Arabia – is very surprising. Although it is a UN member, this country does not participate in the Development Assistance Committee. Furthermore, such countries do not have any obliga-tions resulting from membership in any international organizations (like for example European Union member states in the area of development and cooperation). On the one hand, it is worthy of praise that they actively participate in the global fight against economical underdevelopment, but on the other hand, since they do not have any obligations, they do not show all the statistics and detailed databases (just the amount of spending, without the classification of how much they spend on each form of ODA). The same situation is with the United Arab Emirates. Detailed research on the structure of recipients based on the OECD Statistics and Saudi reports showed that Arabian donors help mainly other Arab recipients[11] (like Jordan, Syria, Lebanon, Yemen). Norway and Switzerland are known as neutral countries in the context of political relations, but both of them represent the group of developed countries, so their contribution in the worldwide ODA system is not surprising. The same situation takes place in the case of Australia and New Zealand. A surprise in the list is certainly South Korea. This small country, with a relatively small population, is quite economically and politically stable. In comparison to its neighbour from the Korean peninsula, it represents a developed economy and democratic standards. Even such a country sees the benefits of participating in development cooperation, what is a great ex-ample for other smaller but stable countries around the world.

As has been mentioned before, at next level authors decide to check percentage of GNI spends of ODA. Checking such indicator helps to decide if countries which spend a lot of mil-lions of dollars, pay equivalently to their economic potential. The results are presented in Table 3.

[8] A survey conducted among European Union countries.

[9] To keep order, all donors report theirs flows not in own currencies but in the international measure currency, which is millions of USD.

[10] In G8 there is also Italy, Japan and Russia, with the last country not being a donor of ODA.

[11] Religious common basis is an important context of understanding.

Table 2: The biggest donors of ODA worldwide

Position	Sum of ODA in years 2000-2015 (in millions of USD)	Country
1	385 843,29	USA
2	180 523,36	United Kingdom
3	177 282,47	Germany
4	164 369,21	Japan
5	152 473,20	France
6	60 011,66	Canada
7	55 746,40	Saudi Arabia
8	54 933,52	Norway
9	44 648,26	Australia
10	33 687,40	Switzerland
11	25 540,45	UAE
12	19 621,60	Turkey
13	14 690,12	South Korea
14	4 854,15	New Zealand

Source: Own analysis based on the OECD Statistics, 2018.

Table 3: An average share of ODA/GNI for the selected countries in 2000-2015

Position	Country *	The average share of ODA/GNI (%)
1	Norway	0.94
2	UAE	0.63
3	United Kingdom	0.48
4	Switzerland	0.41
5	France	0.41
6	Germany	0.35
7	Australia	0.29
8	Canada	0.29
9	Japan	0.21
10	Turkey	0.18
11	USA	0.17
12	South Korea	0.09

Note: * This list does not contain data for New Zealand and Saudi Arabia for lack of information in the OECD Statistic resources as an official database provider.
Source: Own analysis based on the OECD Statistics, 2018.

If we compare the top positions in Table 2 and 3, we can easily see that top donors in mil-lions of USD are not exactly the same as their GNI potential. In fact, only Norway spends a lot in the context of benchmark target. The UN community and then the EU member states set the goal of 0.7% GNI to spend on ODA each year. According to such commitment, we can see how much the main donors can do (only some of them fulfilled the obligation, including the DAC member states). Close to that is also the UAE, however, they have participated in ODA for a relatively short time . The UK is on the third position, with an average share of 0.48 GNI. It is worth mentioning that since 2013, year by year they reach the level of 0.7% ODA/GNI. The biggest surprise in the list is the USA. In absolute numbers, they are on the top (they spend twice as much as the UK), but taking into account its economic potential, the amount of ODA given is in fact not so high. As the greatest economy around the world, they can spend much more on such a purpose than 0.17 % of their GNI.

The research results presented in the second sub-chapter regarding the links between devel-opment assistance and reputation concerned the European Union countries (Leszczyński 2016; 2017). Therefore, the authors of the article decided to verify the trend identified in the earlier studies and check whether it is visible at the level of specific cases. The study was conducted at two levels, on the one hand, referring to the concept of the state's reputation as a result of long-term activities, which included the average share of development assistance in the GNI and the total expenditure on

development assistance of individual donors in the years 2000-2015. On the other hand, the relationships between the size of development assistance and the reputation of states for each of the analysed cases were examined. This approach allows for more accurate identification of the relationships between the reputation of the state and its social responsibility. The countries that are the largest donors of development assistance in the world were selected for the analysis.

The study included the results of the Country RepTrak 2015 report published by the Reputation Institute. The document includes the opinions of 48,000 citizens from the G8 countries. 55 countries with the largest economies in the world were assessed by them in two dimensions, i.e. emotional and rational. In the emotional terms, one can find feelings, admiration, respect and trust in the country. On the other hand, in the case of the rational reputation, they assess such elements as the advancement of the economy, attractiveness of the environment and effectiveness of the government (Reputation Institute, 2015). The results of the analysed countries are presented in table 4.

Table 4: Reputation of the biggest global ODA donors

Country	Country RepTrak place	Country RepTrak score
Canada	1	78.1
Norway	2	77.1
Switzerland	4	76.4
Australia	5	76.3
United Kingdom	13	69.5
Germany	15	69
Japan	16	69
France	19	64.4
USA	22	56.5
UAE	34	51.9
South Korea	36	50.8
Turkey	39	49.8
Saudi Arabia	48	41

Source: Reputation Institute, 2015, Country RepTrak 2015.

It should be noted that 4 out of the 13 largest donors are in the top ten countries with the best reputation. In turn, in the first 20, it is up to 8 countries. This may suggest that there are positive relationships between reputation and the amount of development assistance. The analysis of correlations in the case of development assistance in millions of dollars indicates the lack of relationships between these categories (Pearson's correlation 0.045). However, if we take into account development assistance measured as a share in the GNI, the correlation in this case is 0.369. Although it is weak and statistically insignificant, it can be seen that these compounds are present.

Using the second method, it can be seen that the relationships in the case of the relationship between the reputation and social responsibility of specific states show greater strength. In this situation, in most cases, stronger relationships occur when development assistance measured in millions of dollars is taken into account. The results are presented in table 6.

Table 5: Correlation between country reputation, ODA as a % of gross national income and ODA in million US dollars in 2000-2015 – global scores

Country	Country RepTrak score	ODA in millions of USD*	ODA as a % of GNI**
Pearson's correlation coefficient with Country RepTrak scores	1	0.045	0.369

Note: * The total expenditure on ODA in the years 2000-2015; ** Average result in the years 2000-2015.
Source: Own study based on Reputation Institute, 2015, Country RepTrak 2015, OECD, 2018.

Based on the presented research results, it can be noticed that development assistance can be a tool for building the state's reputation. The analysis of specific cases helped to identify the relationship between social responsibility and the reputation of the state. It should be noted that in each case these relationships are not as strong. In order to verify this relationship, Pearson's correlation coefficient was calculated between the increase in the share of development assistance in the GNI states and in millions of dollars in 2009-2015 and the results of the correlation between development assistance and reputation. In the case of development assistance in millions of dollars, the correlation is 0.712, while in the share terms it is 0.623. On this basis, it can be concluded that the strongest links between development assistance and the state's reputation are in the case of countries that increased their spending on development assistance during this period. These results allow stating that development assistance can be a numerical value of the social responsibility of the state, which is a tool for building its reputation. On this basis, it can be concluded that in 2009-2015 increases in expenditure on development assistance were related to the improvement of the countries' reputation in global public opinion.

Table 6: Correlation between country reputation, ODA as a % of gross national income and ODA in million US dollars in 2009-2015 – by country

Country*	ODA in millions of USD	ODA as a % of GNI	Average score
Australia	0.511253	0.197018	0.354135
France	0.254399	0.214688	0.234544
Japan	0.514562	0.280624	0.397593
Canada	0.367693	-0.1564	0.105647
South Korea	0.718718	0.900795	0.809756
Germany	0.593707	0.534545	0.564126
Norway	0.567104	0.04681	0.306957
USA	0.074669	-0.80849	-0.36691
Switzerland	0.718531	0.445565	0.582048
Turkey	0.715325	0.670636	0.69298
United Kingdom	0.778545	0.729978	0.754261

Note: * Due to incomplete data from the Country RepTrak reports, New Zealand, Saudi Arabia and United Arab Emir-ates were eliminated from the analysis.
Source: Reputation Institute, 2015, Country RepTrak 2015.

5. Conclusions

Official development assistance is part of development economics, which has played a significantly increasing role in modern international discourse. Almost every country around the world is part of this system – some of them as donors and more of them as recipients put on a special DAC Recipients list made by the Development Assistance Committee. It should be noticed that the biggest economies (such as G8) are at the same time the biggest donors (in absolute values) measured by millions of USD spent on ODA. However, although some countries like the USA or the UK spend a lot, their results measured by the percentage of the GNI spent on ODA are not so impressive. Top positions from table 2 and 3 are not the same, which may bring us to a conclusion that many countries do not use their economic potential to play a key role in development cooperation.

Analysing the results of the study, it may be seen that in the case of the approach based on the concept of reputation as the sum of long-term experience of public opinion, the links between development assistance and the reputation of the state are small. However, if an analysis of individual cases is made, it may be seen that in 2009-2015 there were positive and, in some cases, strong links between development assistance and reputation. What was also identified was the variable conditioning the strength of correlation in these years, which was the expenditure on development assistance. On this basis, it was concluded that the amount of development assistance in 2009-2015 on the example of the analysed cases increased its impact on the reputation of the state. This may lead to the conclusion that there is a connection between reputation and development assistance, and what is more, its strength in 2009-2015 increased along with the increase in the state's expenditure on development assistance. On this basis, it can be stated that development assistance is a quantitative exemplification of the social involvement of the state, which affects the assessment of its reputation.

References

Andrzejczak, K. (2010). *Polityka rozwojowa wobec Afryki w polityce zagranicznej Francji w latach 1981-2007*, (in:) Deszczyński, P. (red.), *Kraje rozwijające się w stosunkach międzynarodowych*. Poznań: Wydawnictwo Wyższej Szkoły Bankowej w Poznaniu.

Andrzejczak, K. (2011). *Pomoc rozwojowa Francji dla krajów rozwijających się w latach 1981-2007* (PhD thesis). Poznań: Poznań University of Economics and Business.

DAC (2017). *List ODA Recipients in years 2018-2020*. http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/DAC_List_ODA_Recipients2018to2020_flows_En.pdf (accessed on: 25.10.2018).

Deszczyński, P. (2001). *Kraje rozwijające się w koncepcjach ekonomicznych SPD*. Poznań: Wydawnictwo Akademii Ekonomicznej w Poznaniu.

Deszczyński, P. (2011). *Konceptualne podstawy pomocy rozwojowej*. Poznań: Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu.

Easterly, W. (2007). *Was Development Assistance a Mistake?* American Economic Review, 97(2), 328-332.

Edelman Trust Barometer – trust in crisis, (2017). https://www.slideshare.net/EdelmanInsights/2017-edelman-trust-barometer-energy-results (accessed on: 5.09.2018).

Knoema, (2018). *Country Reptrak 2009-2015*. https://knoema.com/ozexxwd/country-reptrak-top-countries-by-reputation (accessed on: 25.11.2018).

Kopiński, D. (2011). *Pomoc rozwojowa. Teoria i polityka*, Warszawa: Wydawnictwo Difin.

Lancaster, C. (1999). *Aid effectivness in Africa: the unfinished agenda*. Journal of African Economies, 8(4), 487–503.

Latoszek, E. (2010). *Pomoc rozwojowa dla krajów rozwijających się na przełomie XX i XXI wieku*. Warszawa: Szkoła Główna Handlowa.

Lęgiedź, T. (2013). *Ewolucja ekonomii rozwoju*. Gospodarka w Praktyce i Teorii, 1(32), 33-47.

Leszczyński, M. (2016). *Gospodarka niskoemisyjna jako element postrzegania państwa w środowisku międzyna-rodowym – casus Unii Europejskiej*, Zeszyty Naukowe Towarzystwa Doktorantów Uniwersytetu Jagielloń-skiego. Nauki Społeczne, 15(4), 91-111.

Leszczyński, M. (2017). *Rola społecznej odpowiedzialności w kształtowaniu reputacji na przykładzie pomocy rozwojowej państw Unii Europejskiej*. Refleksje, 15, 51-66.

Leszczyński, M. (2018). *Międzynarodowe public relations jako narzędzie konkurencyjności gospodarki na przykładzie Polski* (PhD thesis). Poznań: Poznań University of Economics and Business.

Mazzucato, M. (2011), *The Entrepreneurial State*, London: Demos.

OECD, (2017). *Development Co-operation Report*. https://read.oecd-ilibrary.org/development/development-co-operation-report-2018_dcr-2018-en#page1 (accessed on: 25.10.2018).

OECD, (2018), *Definition of ODA*, http://www.oecd.org/dac/stats/officialdevelopmentassistancedefinitionandcoverage.htm (accessed on: 25.10.2018).

Olins, W. (2000). *Why Companies and Countries are Taking On Each Other's Roles*. Corporate Reputation Review, 3(3), 254-265.

Piasecki, R. (2007). *Ewolucja teorii rozwoju gospodarczego krajów biednych*, (in:) Piasecki, R., *Ekonomia rozwoju*, Warszawa: Polskie Wydawnictwo Ekonomiczne.

Reputation Institute, (2015). *Country Reptrak 2015*. https://www.reputationinstitute.com/research/2015-country-reptrak (accessed on: 3.10.2018).

Schooler, R.D. (1965). *Product Bias in the Central American Common Market*. Journal of Marketing Research, 2, 394-397.

Stiglitz, J. (1989). *Markets, Market Failures and Development*. American Economic Review, 2(79), 197-203.

United Nations, (2018). *Global Issues: Fast Facts*. http://www.un.org/en/sections/issues-depth/global-issues-fast-facts/index.html (accessed on:: 10.10.2018).

Zajączkowski, K. (2006). *Unia Europejska - Afryka Subsaharyjska: stosunki u progu XXI w*. http://www.ce.uw.edu.pl/pliki/pw/4-2006_Zajaczkowski.pdf (accessed on: 10.10.2018).

Creative Commons Attribution-NonCommercial 4.0 International Public License
https://doi.org/10.18559/ref.2018.2.4

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

Efficiency of the R&D sector in the EU states. Does the source of funds matter?

Kamil Albert Homski[1]

[1] Poznan University of Economics and Business, Poland

ABSTRACT

The first aim of this study was to measure the efficiency of the R&D sector in the EU countries. The findings have indicated that the sector's efficiency was different in particular countries. It was more than three times higher in the most efficient states than in the least efficient ones. The results also indicate that decreasing returns to scale are characteristic in the R&D sector in the EU countries. The second aim was to examine the relationship between the efficiency of the R&D sector and the structure of its financing. The empirical results occurred to be consistent with the research hypotheses – the public sector's share in the R&D financing structure affects the efficiency of the R&D sector positively, while the private sector's share affects it negatively.

Keywords: R&D sector, R&D financing, R&D efficiency, R&D financing structure, EU countries.

1. Introduction

The neoclassical theory of economic growth presented technical progress as a major source of long-term growth (Solow, 1957). However, it treated it as an exogenous phenomenon and did not identify or analyze its determinants. A few decades later, the endogenous theory of economic growth has linked the technical progress with the research and development (R&D) activity in the economy (Lucas, 1988; Romer, 1986, 1990). Since then, the role of the R&D sector in economic theory has been growing. It has been found that R&D sector's activity, understood as innovations, diffuses to various sectors and countries increasing productivity in particular enterprises and driving the global economy (Baumol, 2002; Keller, 2002).

Most economists agree that ownership and sources of financing affect the efficiency of economic activities. However, there is no wide agreement about the nature of this relationship. Similarly, in the case of the R&D sector, there are no clear results concerning the influence of the source of funds and the sector's efficiency.

This article has two goals. The first is to estimate the efficiency of the R&D sector in the European Union states, where by the R&D sector we understand all persons and institutions working in order to create a new knowledge or to find a new application for existing knowledge. The next objective is to investigate the relationship between the R&D financing structure and its efficiency. The study is conducted for the years 2006-2015.

The DEA method was used in the study to measure the efficiency of the R&D sector in the EU countries. Expenditure on R&D was an input variable. The Hirsch index, grants awarded by the European Research Council and the share of export of high technologies in total export were used as outputs. In the next step, the correlation between the efficiency of the R&D sector and the public and private sectors' share in its financing was measured.

The structure of the article is as follows. In the second part, literature on the influence of the source of funds on the R&D sector's efficiency is discussed. In the third section, the

research method is presented. The next section shows the results of the research. The last part concludes the paper.

2. Literature review

Some authors indicate that public spending on R&D is less efficient than private spending. This statement is confirmed by a part of empirical studies conducted in recent years. Wang (2007) has measured R&D efficiency using stochastic frontier analysis. He found that the involvement of the public sector is a negative factor affecting R&D efficiency and argued that this is due to the bureaucracy, which makes the public sector less efficient than the private one. Guan and Yam (2015) examined the impact of government innovation programs on innovation activity in the private sector and found that this influence is negative. However, the authors noted that the results should be treated with caution, because this dependency was statistically significant only in part of the cases examined.

Conversely, there are findings which indicate that public sector's involvement in the R&D sector affects the R&D efficiency positively. Guellec and Van Pottelsberghe de la Pottrie (2004) examined the impact of public and private spending on R&D on the level of productivity in the economy. The authors argued that the government's R&D programs fulfil a public mission, providing basic knowledge which does not increase productivity directly but might be used as a base for further innovations. Private financing usually focuses on applied research. The authors have found that an individual firm's returns on this applied research are usually lower than social returns on the public sector's research. In a similar fashion, Lee (2017) estimated the efficiency of the R&D sector using the Tobin model and found that the public sector's share influences the R&D efficiency positively. He stated that the private sector, in contrast to the public sector, focuses on the commercial performance. Thus, the private research mostly is aimed at industry specific technology. Public research provides basic technology, which is available for use in all industries.

Other authors found that particular countries differ in the level of the R&D sector's efficiency and that this sector is generally faced with decreasing returns to scale (Wang and Huang, 2007; Sharma and Thomas, 2008). However, the results also did not allow drawing clear conclusions on the impact of the financing structure on the sector's efficiency.

The ambiguity of the previous findings is an incentive to further research in this field. The presented statements allow conjecturing that public research also affects the private sector's research positively. It is confirmed by Ali-Yrkkö (2004), who found that public spending on R&D drives the private research. Similarly, David, Hall and Toll (2000) implied that knowledge provided by government research is available for private firms. Government agencies, public institutes and national laboratories also increase research capabilities in the whole economy. These considerations allow formulating the following research hypotheses:

- (H1) The amount of the public sector's shares in the R&D financing structure influences the R&D sector efficiency positively.
- (H2) The amount of the private sector's share in the R&D financing structure influences the R&D sector's efficiency negatively.

3. Research method

The first step of the empirical analysis was to measure the efficiency of the R&D sector using the DEA method. DEA is a method of measuring technical efficiency, defined as a quotient of weighted sum of the outputs by weighted sum of inputs. This method is based on the formulation of the decision-making mechanism with weights as decision variables. The advantage of that method is that it allows measuring efficiency using a variety of variable inputs and outputs. DEA measures relative efficiency. It means that the most efficient object is understood as being 100% efficient and efficiency of others is defined in relation to it (Domagała, 2007).

A mathematical formulation of the basic DEA model is presented by the equation:

$$\theta_O = \sum_{r=1}^{S} u_{ro} y_{ro} \Big/ \sum_{i=1}^{M} v_{io} x_{io}, \qquad (1)$$

where: θ_O – efficiency of the O-th object, u_{ro} – weight of the r-th output variable in the O-th object, y_{ro} – value of the r-th output variable in the O-th object, v_{io} – weight of the i-th input variable in the O-th object, x_{io} – value of the i-th input variable in the O-th object.

Two DEA models have been used in the study. The first one was the basic model that assumes constant returns scale. This model is based on the transformation of the equation (1) into a linear form in the following way (Domagała, 2009):

$$t\sum_{i=1}^{M} v_{io}x_{io} = 1, \tag{2}$$

where: t > 0. Multiplying the numerator and the denominator of the equation (1) by t, we can use the following transformation:

$$\begin{matrix} \mu_{ro}, = tu_{ro}, r = 1, \dots, s \\ V_{io}, = tv_{io}, i = 1, \dots, m \end{matrix} \tag{3}$$

This allows us to formulate the following decision-making task:

$$max\theta_O = \sum_{r=1}^{s} \mu_{ro}y_{ro}, \tag{4}$$

with limitations:

$$\begin{matrix} \sum_{i=1}^{M} V_{io}x_{io} = 1, \\ \sum_{r=1}^{S} \mu_{ro}y_{ro} - \sum_{i=1}^{M} V_{io}x_{io} \leq 0, \\ v_{io}, \mu_{ro} > 0. \end{matrix} \tag{5}$$

In addition, an extended version of the model which allows analysing the returns to scale was used. The additional decision variable λ, the so-called intensity weight is included in this model. The decision-making task is to find the minimum efficiency of the O-th $\min\theta_{BCC,O}$ object with the following limitations:

$$\begin{matrix} \theta_{BCC,O}x_{io} \geq \sum_{j=1}^{n} x_{ij}\lambda_{jo}, \\ y_{ro} \leq \sum_{i=1}^{M} y_{rj}\lambda_{jo}, \\ \sum_{i=1}^{M} \lambda_{jo} = 1, \\ \lambda_{jo} > 0. \end{matrix} \tag{6}$$

This formulation transforms a simple linear model into a nonlinear form. Therefore, it relaxes the assumption of constant returns to scale and allows also variable returns to scale to occur in the model.

However, if we are analysing research and development expenditures, the assumption of variable returns to scale seems to be more intuitive. Previous studies on the efficiency of the R&D sector using the DEA method also confirm this assumption (Wang and Huang, 2007; Sharma and Thomas, 2008).

The European Union is an interesting region to undertake such research. Most of the discussed findings indicate that the R&D sector's efficiency depends mostly of the public sector's involvement. An average public sector's share in R&D financing in the EU states in the analysed period was relatively high – it was 33.2%. However, an average private sector's share in the R&D financing was even higher – 54.9%. Secondly, the R&D financing structures in the EU states are different. In 16 states, private sector's expenditure is predominant, and in 12 states public sector's share is prevailing. Thus, the analysis of the R&D efficiency in the European Union states should provide reliable conclusions.

Initially, six variables were used in the research. The R&D expenditure (measured as a percentage of GDP) and the R&D sector personnel (measured as a percentage of the total employed in the country) were used as input variables. The following variables were used as outputs: high-tech export as a percentage of total export, the Hirsch index estimated for a particular state (excluding publications in the humanities and social sciences, because their influence on the innovations is controversial), grants in science and technical studies funded by the European Research Council (ERC) – as a percentage of the accepted submissions, and the amount of patents registered per GDP.

However, a limitation of the DEA method is that when too many variables relative to the number of examined objects are used, it causes the method to lose its discriminatory power. This leads to redundancy of the effective objects, especially if these variables are strongly correlated (Domagała, 2014). That effect was also found in this research which forced us to reject a part of the variables. Thus, the R&D personnel and registered patents have been rejected because they were most strongly correlated with other variables. Therefore, the following variables were finally used in the study: expenditure on R&D (including all sources of funds), high-tech export, the Hirsch index and ERC grants. The empirical analysis was conducted for the years 2006-2015 (with the exception of the ERC grants, where it was possible to collect the data only for the period of 2007-2013). The average values of the variables during the analysed period were used in the estimations.

As the last step, the correlation between the estimated R&D efficiency and the public and private sectors' share in the R&D financing, measured as a percentage of the total expenditure, was estimated. Although the correlation analysis does not allow revealing the underlying cause and effect relationship, it allows identifying common cross-country tendencies, which can be the subject of a more detailed future research.

4. Results and discussion

The results for both types of DEA models (with and without constant returns to scale) are presented in Table 1. The model that assumes constant returns to scale indicates that in six countries the R&D sector can be considered as efficient: Cyprus, Italy, Latvia, Malta, the Netherlands and Spain. The average efficiency of the R&D sector in the EU countries was 66.98%. The least efficient was Estonia, Finland and Slovenia, with efficiency below 30%. When the assumption concerning the variable returns to scale was taken into account, it has occurred that the average R&D efficiency equals 72.51%. It is higher than with constant returns to scale, which indicates that returns to scale in the R&D sector in the European Union are decreasing. This is consistent with the results of the previous studies. What is more, besides the countries that were found efficient in the previous model (Cyprus, Italy, Latvia, Malta, the Netherlands and Spain), four more countries (France, Greece, Romania and the United Kingdom) occurred to be 100% efficient in the new estimates. Similar to the previous model, the least efficient are once more Estonia, Finland and Slovenia.

Table 1: Estimated efficiency of the R&D sector in the EU states in the years 2006-2015

Country	Efficiency – constant returns to scale	Efficiency – variable returns to scale
Austria	44.30%	44.66%
Belgium	61.54%	62.36%
Bulgaria	57.42%	79.27%
Croatia	49.03%	59.42%
Cyprus	100.00%	100.00%
Czech Republic	43.93%	45.35%
Denmark	46.75%	47.08%
Estonia	27.63%	29.86%
Finland	25.47%	25.54%
France	90.97%	100.00%
Germany	72.12%	81.84%
Greece	95.18%	100.00%
Hungary	83.17%	95.41%
Ireland	61.59%	72.85%
Italy	100.00%	100.0%
Latvia	100.00%	100.00%
Lithuania	35.68%	50.34%
Luxembourg	43.58%	45.53%
Malta	100.00%	100.00%
Netherlands	100.00%	100.00%
Poland	90.54%	97.54%
Portugal	52.39%	56.61%
Romania	81.97%	100.00%
Slovakia	58.58%	69.72%
Slovenia	21.26%	25.49%
Spain	100.00%	100.00%
Sweden	41.29%	41.35%
United Kingdom	91.08%	100.00%

Source: Own elaboration based on (ERC, 2018; Eurostat, 2018; Scimago, 2018).

The results of the correlation analysis are presented in Table 2. The findings indicate that there is a statistically significant correlation between the efficiency measured by the model with variable returns to scale and the public and private sectors' share in R&D financing. What is more, the correlation with the government share is positive and the correlation with business shares is negative, which is consistent with the analysed hypotheses.

The signs of the relationship with the private and public shares are also consistent with the hypotheses for the constant returns to scale, but this correlation is weaker than with the assumption of variable returns to scale. However, we can suppose that this result is contaminated because of decreasing returns in R&D. Thus, the results obtained with the model with variable returns to scale can be considered as more convincing.

The negative correlation between the efficiency and the size of the expenditures on R&D is surprising. In the case of the model with constant returns to scale it could be explained by decreasing returns to scale, but in reference to the model with variable returns to scale it is more unexpected. A possible explanation of that are the R&D externalities. The knowledge produced in the state with higher expenditures on R&D is available in the countries with lower expenditures, especially in the EU which is an open economy.

Table 2: Correlation coefficients between the R&D efficiency and public and private sectors' share in the R&D financing and total expenditure on R&D

Variable	Efficiency – constant returns to scale	Efficiency – variable returns to scale
	Correlation coefficient	Correlation coefficient
Public sector's share	0.322*	0.377**
Private sector's share	-0.328*	-0.397**
Total expenditure on R&D	-0.432**	-0.510***

Note: The Pearson's correlation coefficient for all 28 EU countries was calculated in all estimates. Asterisks denote the significance level: *** - 0.01, ** - 0.05, * - 0,1.
Source: Own elaboration based on (Eurostat, 2018).

Figures 1a and 1b graphically show the relationship between the public and private sectors' share in R&D financing and the sector's efficiency. The results indicate that the public and private sectors' share in the R&D financing determine 14.2% and 15.7% variability of the sector's efficiency, conversely. However, it is clear that there are also other factors that affect the sector's efficiency. The goal of further research should be to find these factors.

There is an interesting lack of noticeable geographical relationships that determine the efficiency of the R&D sector. The results indicate that there is no clear division between old and new EU countries. Another surprising finding is the very low efficiency of the R&D sector in the developed Scandinavian countries. The proposed explanations in this case are also the external effects of the R&D sector, which cause the reduction in relative efficiency in the countries with higher R&D expenditures.

The results obtained are consistent with the established research hypotheses. They allow concluding that the higher the public sector's share in the R&D financing is, the higher the efficiency of this sector is. This is also consistent with the theoretical considerations that the public research increases the efficiency of the whole sector. Conversely, the higher the private sector's share in the R&D financing is, the lower the efficiency of this sector is.

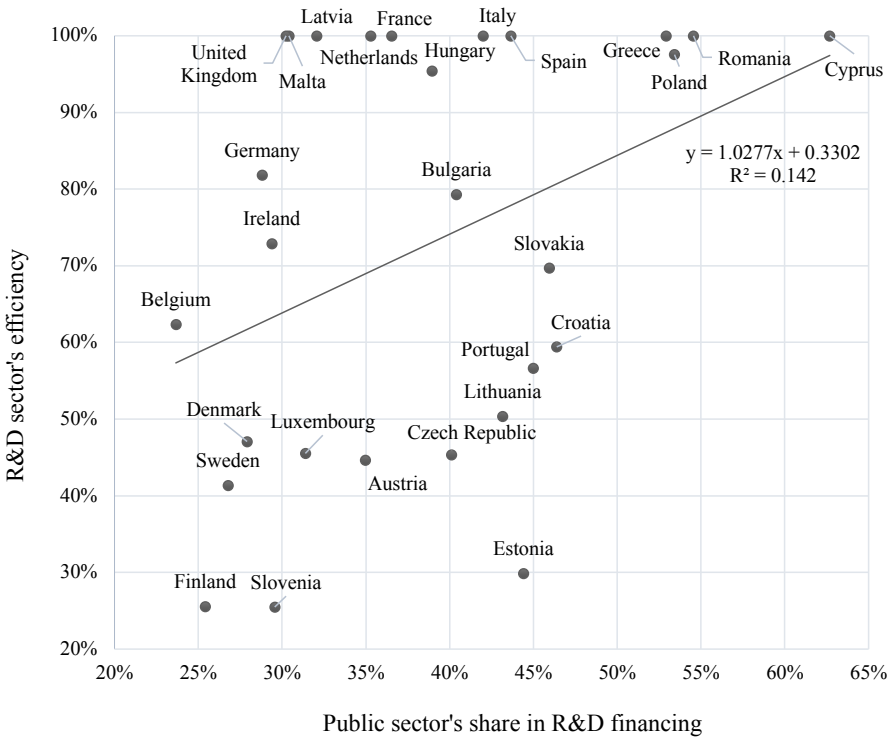


Figure 1a. Public sector's share in R&D financing and R&D efficiency measured with variable returns to scale

Source: Own elaboration based on Eurostat (2018)

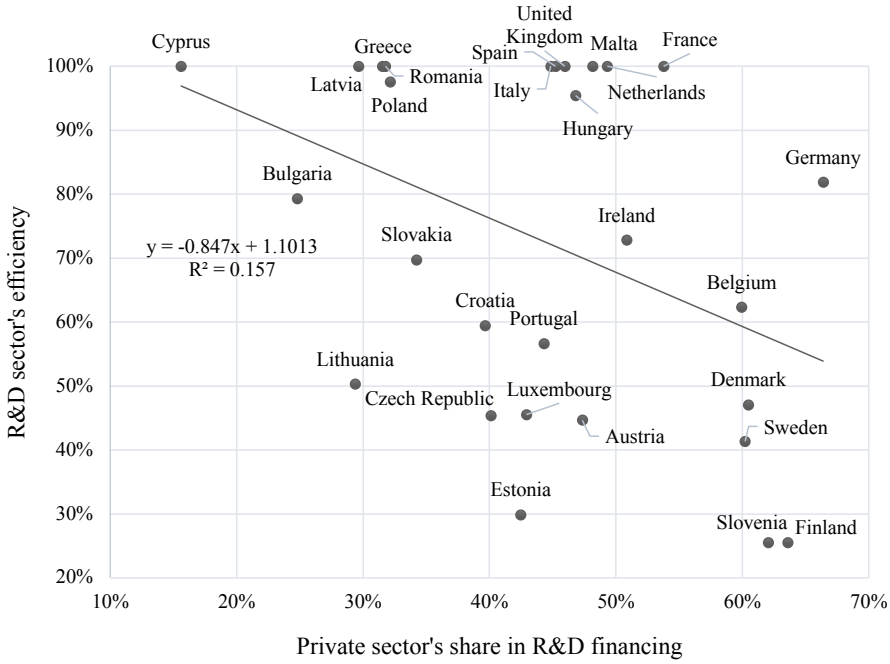


Figure 1b. Private sector's share in R&D financing and R&D efficiency measured with variable returns to scale

Source: Own elaboration based on Eurostat (2018)

5. Conclusions

The first objective of this study was to measure the efficiency of the R&D sector in the EU countries. The findings have indicated that the sector's efficiency was different in particular countries. It was more than three times higher in the most efficient states than in the least efficient ones. The results also indicate that decreasing returns to scale are characteristic in the R&D sector in the EU countries.

The second purpose was to examine the relationship between the efficiency of the R&D sector and the structure of its financing. The empirical results occurred to be consistent with the research hypotheses – the public sector's share in the R&D financing structure affects the efficiency of the R&D sector positively, while the private sector's share affects it negatively.

The study has the following limitations. First of all, there are the characteristics of the DEA method which lead to the multitude of efficient objects. It causes the findings in the next steps of the research to be contaminated, and thus they must be treated as not clear. We also have to note that the correlation analysis does not allow formulating strong conclusions. It is therefore necessary to use more advanced methods in further studies.

Further research should also focus on the following issues. Inclusion of a greater number of states will allow using more variables in the research. The results indicate that besides the source of funds there are other factors affecting the R&D sector's efficiency. It may be, for instance, conjectured that the legal regulations play a role in determining the R&D sector's efficiency. Moreover, the negative correlation between the amount of expenditure on R&D and the R&D efficiency is worth investigation.

References

Ali-Yrkkö, J. (2004). *Impact of public R&D financing on private R&D: Does financial constraint matter?* ETLA Discussion Papers, No. 943, Finland: The Research Institute of the Finnish Economy (ETLA).

Baumol, W. J. (2002). *The free-market innovation machine: Analyzing the growth miracle of capitalism*. Princeton University Press.

David, P. A., Hall, B. H., Toole, A. A. (2000). Is public R&D a complement or substitute for private R&D? A review of the econometric evidence. *Research policy*, 29(4-5), 497-529.

Domagała, A. (2007). Metoda Data Envelopment Analysis jako narzędzie badania względnej efektywności technicznej. *Badania operacyjne i decyzje*, (3-4), 21-34.

Domagała, A. (2009). *Zastosowanie metody Data Envelopment Analysis do badania efektywności europejskich giełd papierów wartościowych*. in: B. Guzik, Poznań: Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu.

Domagała, A. (2014). O wykorzystaniu analizy głównych składowych w metodzie Data Envelopment Analysis. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu. Taksonomia*, 23(328 Klasyfikacja i analiza danych - teoria i zastosowania), 254-263.

European Research Council, (2015). *ERC Funding Activities 2007-2013*. Luxembourg: Publications Office of the European Union.

Eurostat, (2018). http://ec.europa.eu/eurostat/data/database (access: 13.02.2018).

Guan, J., & Yam, R. C. (2015). Effects of government financial incentives on firms' innovation performance in China: Evidences from Beijing in the 1990s. *Research Policy*, 44(1), 273-282.

Guellec, D., Van Pottelsberghe de la Potterie, B. (2004). From R&D to Productivity Growth: Do the Institutional Settings and the Source of Funds of R&D Matter? *Oxford Bulletin of Economics and Statistics*, 66(3), 353-378.

Keller, W. (2002). Geographic localization of international technology diffusion. *American Economic Review*, 92(1), 120-142.

Lee, J., (2017). A Study on the Determinants of R&D Efficiency in Government-supported Research Institutes Using Tobit Model. *Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Soci-*

ology, 7(8), 343-352.

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3-42.

Romer, P. M., (1986). Increasing returns and long-run growth. *Journal of Political economy*, 94(5), 1002-1037.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2), S71-S102.

Scimago, (2018). https://www.scimagojr.com/ (access: 13.02.2018).

Sharma, S., & Thomas, V. (2008). Inter-country R&D efficiency analysis: An application of data envelopment analysis. *Scientometrics*, 76(3), 483-501.

Solow, R. M., (1957). Technical change and the aggregate production function. *The review of Economics and Statistics*, 39(3), 312-320.

Wang, E. C. (2007). R&D efficiency and economic performance: A cross-country analysis using the stochastic frontier approach. *Journal of Policy Modeling*, 29(2), 345-360.

Wang, E. C., & Huang, W. (2007). Relative efficiency of R&D activities: A cross-country study accounting for environmental factors in the DEA approach. *Research Policy*, 36(2), 260-273.

Creative Commons Attribution-NonCommercial 4.0 International Public License
https://doi.org/10.18559/ref.2018.2.5

RESEARCH PAPERS
IN ECONOMICS AND FINANCE

JOURNAL HOMEPAGE: www.ref.ue.poznan.pl

Effects of tax sheltering on earnings management in Nigeria

Osegbue, Ifeanyi Francis[1], Nweze Austin[2], Ifurueze Meshack[1], Nwoye Chizoba Mary[1]

[1] Chukwuemeka Odumegwu Ojukwu University, Nigeria
[2] Enugu State University of Science and Technology, Nigeria

ABSTRACT

This study examines how tax sheltering and its interactions with cash effective tax rate, long-term effective tax rate, tax savings, book tax gap, temporary difference of tax shelter and permanent difference of tax shelter impacted the modified Jones earnings model (earnings quality manage-ment) from 2009 to 2016. The study used a sample of all 116 listed companies on the Nigerian stock exchange ranging from all sectors excluding financial services sector due to its reporting sys-tem. Preliminary analyses were also conducted, such as descriptive statistics and the correlation matrix. In analysing the data, the study adopted panel multiple regression to identify the possible effects on earnings quality. We employed the panel generalised method of moments regression be-cause we suspected there is a variety of moment conditions that are deduced from the assumption of the theoretical model. The result shows that tax sheltering had a significant and positive effect on the quoted the modified Jones earnings model (earnings management). We concluded that the cash effective tax rate, long term effective tax rate, tax savings temporary and permanent tax difference are insignificant meaning that stake-holders in Nigeria are interested in companies that produce quality financial reports, which clearly shows that there is high earnings manipulation among Nige-ria quoted companies as most firms manipulate earnings through abnormal accruals. This is at-tributed to pressure Nigeria companies face in maintaining existing investors' confidence, smooth income over the years. While the significant effects of the book tax gap show that increase or de-crease in the book tax gap is a signal to high or low earnings quality. These reactions were different in developed economies, like the United States, as the cash ef-fective tax rate, long-term effective tax rate, tax savings, book tax gap and temporary difference are significant where news about involve-ment in tax aggressiveness affects the quality of the firm's earnings.

Keywords: tax sheltering, earnings management, cash ETR, long-term ETR, tax savings, book tax gap, tempo-rary tax diffe-rence, permanent tax differenc.

1. Introduction

Tax sheltering practices are usually imple-mented to minimise the tax burden to achieve greater after-tax earnings per share and cash available for shareholders. Thus, it could also reflect a decline in taxable income when ma-naged through tax planning practices that are legal as well as activities that may be viewed as illegal in some circumstances to reduce tax liability. References provide that tax sheltering can be substituted with tax aggressiveness, tax planning and tax avoidance. Since tax sheltering is a form of corporate decision and action that could reflect both executives' and non-execu-tives' aversion to risk (Lanis and Richardson 2012; Chen, Chen, Cheng, and Shevlin 2010; Khurana, and Moser 2013; Lanis, Richardson and Taylor 2015; Francis, Hasan, Wu and Yan 2014). The reaction of tax aggressiveness on earnings quality has emerged as an issue of interest to analysts, investors, managers and other market participants (Lipe 1990; Chan, Jegadeesh, and Lakonishok, 2006; and Cahan, Emmanuel, and Sun, 2009). Managers are much concerned about meeting analysts' fore-cast by maintaining sustainable growth of the companies as a means to pro-tect themselves,

while researchers have documented issues where companies with higher earnings having a lower effective tax rate is an issue of the companies' tax aggressiveness practices. From the perspective of previous studies, researchers have documented the effect of tax sheltering on earnings quality. Such researchers as Lyimo (2014); Atwood, Michael, Drake, Linda and Myers (2010) concluded that higher consistency between the accounting profits and tax base earnings adds to the quality of earnings and undermines earnings persistence; Linda and Chen (2012) indicated that the reaction of tax policies on earnings management is significant and it affects the information content of earnings quality as well (Mohammadreza, Aliasghar and Hamid, 2013). Their results show differences on how investors react to issues of tax sheltering on earnings quality in different environments. None of these studies factored the current Nigerian situation considering the tax agencies' strategies and stakeholders' reaction of tax sheltering on earnings quality of Nigerian firms to the best of the researchers' knowledge.

In the Nigerian context, the Federal Inland Revenue Services focus on improving compliance and expanding the tax base rather than introducing new taxes or increasing the rates of existing tax-es due to decline in oil revenue (PWC Nigeria tax alert September 2015). Nigeria is undergoing a lot of restructuring on fiscal policy such as National tax policy, transfer pricing guidelines for mul-tinational enterprises and tax administrations which mandate all organizations to include transfer pricing declaration and disclosure form during tax return (Nolands taxflash 2017), voluntary assets and income declaration scheme (VAIDS) and so on. One of the Federal Inland Revenue Services' strategy is evaluating tax aggressiveness practices of Nigerian firms against their earnings. As tax agencies are on the pressure of increasing government revenue through taxation, this has created another face for valuing firms' earnings through tax aggressiveness. These agencies have increased their drive on tax audit and investigations on Nigerian firms, publishing reports on the firms' tax aggressiveness strategies, by using their statutory tax rate and effective tax rate. This recent process will lead to another reaction to Nigerian firms by stakeholders ranging from the government, in-tending investors, business managers, stock market analysts and business owners, which is the motivating factor of this research trying to find out the reaction of tax sheltering practices to earn-ings quality on the quoted firms in Nigeria. What are the tax sheltering reactions to firms' earnings? Are they significant? To what extent of significance? Is it positive or negative? The main aim of the study is to determine the effects of tax sheltering on earnings quality management in Nigeria, while the specific objectives are:

1. Determine the effect of the cash effective tax rate on earnings quality
2. Determine the effect of the long term cash effective tax rate on earnings quality
3. Determine the effect of tax savings on earnings quality
4. Investigate the effect of the book tax gap on earnings quality
5. Ascertain the effect of the temporary difference of tax shelter on earnings quality
6. Determine the effect of the permanent difference of tax shelter on earnings quality

A set of null hypotheses were formulated for the study as follows:

1. The cash effective tax rate does not have a significant effect on earnings quality
2. The long term cash effective tax rate does not have a significant effect on earnings quality
3. Tax savings do not have a significant effect on earnings quality
4. The book tax gap does not have a significant effect on earnings quality
5. The temporary difference of tax shelter does not have a significant effect on earnings quality
6. The permanent difference of tax shelter does not have a significant effect on earnings quality

The study covers 165 quoted firms in the Nigerian stock exchange from 2009 to 2016. Howev-er, it ascertains the effects of the cash effective tax rate, long term cash effective tax rate, tax sav-ings, book tax gap, temporary difference of tax shelter and permanent different of tax shelter on earnings quality of quoted firms in Nigeria stock exchange.

The remaining sections of the paper are organised as follows. Section 2 briefly reviews empirical literature on earnings quality. It discusses its effect on tax sheltering. The research design is de-scribed in Section 3, while Section 4 presents and discusses the empirical findings. Section 5 pro-vides a summary of the results, conclusion and recommendations.

2. Review of related literature

2.1. Conceptual Framework

2.1.1. Corporate tax aggressiveness

Stephen, Sophie, Jean-Pierre and Matthew (2014) defined corporate tax aggressiveness as ex-amination of a firm's tendency to manage its taxable income downward through more or less ag-gressive tax planning activities. It is a situation close to abusive tax avoidance, which is the 'worst case' of tax aggressiveness. This has

been established in a judgment rules in the United States, Canada and some countries. Tax aggressiveness refers to aggressive tax planning observed to find some degrees of artificiality or abnormality in the firms' financial transaction. The question of legal-ity or illegality lies on courts, tax authorities or outside observers. A firm's tax position is not con-sidered as aggressive if it is not based on technical merits; the position will be subjected to examina-tion. However, an uncertain tax position is considered to be tax aggressiveness to some degree.

Canada Revenue Agency (2013) is of the view that tax aggressiveness is an arrangements that have some legal basis in a technical sense, but firms go beyond the intensions of the legislator that passed the law. They simplified it to be arrangements made by firms with a primary purpose of avoiding the payment of the required taxes, which could be in violation of the taxation laws. Firms can possibly divide potential tax reduction into arrangements that have the category of tax aggres-siveness, changing gradually from fraud to legitimacy. Those categories may be paralleled to the corporate moral development stages proposed by Reidenbach and Robin (1991) that reported one end of the gradual change in tax aggressiveness includes inadequate books and records, substantial understatement of income, fraudulent failure to file tax returns, lying, deceit and hiding transactions.

Many variables have been used in previous studies to capture tax sheltering and aggressiveness activities, e.g., Stickney and McGee (1982); Gupta and Newberry (1997); Desai and Dharmapala (2006); Frank et al. (2009); Salihu et al.; (2013); Armstrong, Blouin and Larcker (2012) Lisowsky, Robinson, and Schmidt, (2013) and others. They are: effective tax rate; tax savings; book tax gap or difference; tax shelter with its temporary and permanent differences. Frank et al. (2009) propose an approach in which they combine the literature on effective tax rates and discretionary accruals to estimate the discretionary permanent differences that constitute their measure of tax sheltering and aggressiveness. The variable presents the advantage of being less correlated, as compared to other tax aggressiveness measures, to earnings quality.

2.1.2. Corporate earnings quality

Sepe, Nelson, Tan and Spiceland (2012) define earnings quality as the ability of reported earn-ings (income) to predict a company's future earnings. It is an assessment criterion for how "repeata-ble, controllable and bankable" a firm's earnings are, amongst other factors, and has variously been defined as the degree to which earnings reflect underlying economic effects, estimates of cash flows, conservative and predictable.

Warshavsky (2012) on his analysing earnings quality reported it as an important aspect of ascer-taining the firms' financial status, which has been studied since 1934 (according to Graham and Dodd's security analysis in Warshavsky 2012). Earnings quality refers to the ability of a firm's published earnings to best represent its true earnings. It is the stability, or lack thereof, in a firm's reported earnings. Srinidhi, Gul, and Tsui, (2011) as explained in Lyimo (2014) reported earnings quality as the ability of the firms' current earnings to reflect the future cash flow and earnings. In this direction, earnings quality reflects best how the current earnings can predict the future earnings of firms.

2.2. Theoretical framework

This study is anchored on prospect theory and tax planning theory, which states that when firms face risks and options of making decisions, firms have the options of using aggressive tax planning activities to reduce its taxable income, as to increase its earning.

Dhami and Al-Nowaihi (2007), following prospect theory, characterise individuals as loss averse. These individuals overweight small probabilities while underweighting the large ones. Their results shows that despite the existence of low audit probabilities and penalty rates in actual prac-tice, the magnitude of tax aggressiveness predicted by prospect theory is consistent with the data. Individuals are also predicted to respond to an increase in the tax rate by increasing the amount evaded. This accords with the bulk of the evidence, but contrasts with the converse prediction made by the expected utility theory. Optimal tax rates predicted by prospect theory, in the presence of tax aggressiveness behaviour, are consistent with actual tax rates. Prospect theory was developed to explain actual choice under generic situations of risk. They used the parameters of human choice that are revealed from independent experimental evidence, stating that prospect theory explained the tax aggressiveness puzzles. Its predictions about the magnitudes of optimal income taxes in the presence of tax aggressiveness are indicative of the actual magnitudes. They conclude that the be-haviour of tax payers provides strong support for prospect theory.

Some studies have dealt with the problem of tax aggressiveness in the literature on prospect the-ory. Yaniv (1999), in Gwenola (2012), analyses the influence of obligatory advance tax

payments on the taxpayer's aggressiveness decision. He applies prospect theory to a simple model of tax ag-gressiveness, using the income after the payment of the tax advance and prior to the filing of a re-turn for the reference income, and demonstrates that advance tax payments may be a substitute for costly detection efforts in enhancing compliance. Bernasconi and Zanardi (2004), in Gwenola (2012), used cumulative prospect theory with a general reference point but with particular probabil-ity weighting and utility functions.

Dhami and al-Nowaihi (2007), in Gwenola (2012), applied cumulative prospect theory to tax aggressiveness, considering the legal after--tax income to be the reference point because it is the only one with which the taxpayer is in the domain of gains if not caught, and in the domain of losses if caught. They use a probability of detection which depends on the amount of income evaded and introduce stigma costs of evasion. Using the power utility function of Tversky and Kahneman (1992), they show that the predictions of prospect theory are consistent with the evidence. Using parameters estimated by the experimental literature and the weighting probability function of Prelec (1998), they show that relative to the expected utility theory, prospect theory provides a much better explanation of tax aggressiveness.

2.2.1. Prospect Theory

It is a theory that is based on decision making when faced with conditions of risk. Decisions are based on judgements. Judgements are assessments about the external positions of the external envi-ronment, which are made under conditions of uncertainty. It is hard to foresee the certainties or consequences of events. Decisions are internal and are difficult when choices differ in values and goals. Prospect theory addresses how choices are evaluated in the decision making process. The theory was propounded by Kahneman and Tversky in 1979. Prospect theory predicts that firms tend to be risk seeking in a domain of losses or crises. They applied psychophysical principles to ascertain decision-making and judgment. Reporting that firms are making decisions according to how management brains processes information, and not on the basis of basic part and usefulness that certain option possesses for decisions making.

2.2.2. Tax planning theory

The theory of tax planning is a theory that states that tax payers have the capacity to arrange their financial activities in such a manner so as to suffer a minimum expenditure for taxes through effec-tive tax planning. It was propounded by William Hoffman in 1961 and explains that all tax planning does not reduce the tax liability to the desired minimum level. The tax planning that is not cut properly to suit the individual taxpayer may have the ultimately adverse effect of maximizing the tax. Tax planning must likewise be distinguished from tax saving. There are many transactions, once closed, where the taxpayer is capable of accomplishing tax saving by following an accepted tax avoidance procedure. This would certainly be the case of the taxpayer who, by consulting a tax practitioner, was able to learn about the capital gains benefits of certain securities transactions that have already transpired. This is a commendable segment of the practitioner's work, but it is not tax planning. Tax saving usually becomes the result of tax planning, but it may be accomplished by other names. Hoffman (1961), in Mgammal and Ismail (2015), reported that tax planning activity theories introduce concepts and principles that are typically applicable to tax practitioners. Tax plan-ning could not be continued for long except if the activities of tax planning are "flexible", meaning continuity of the strategies. This is particularly applicable to the cases of tax planning strategies that depend on tax regulation ambiguities and loopholes. Thus, tax planning strategies must be time-oriented and proportionate in the logic that "the past, the present and the future limit requires con-sistency. But the present limit must be further circumscribed in the light of the taxpayer's future requirements".

2.3. Empirical Review

2.3.1. Studies on developed markets

Dyreng et al. (2010), focused on long run corporate tax aggressiveness on earning on the basis of the United States. They used the accounting effective tax rate to measure tax aggressiveness. The result indicates a significant positive effect of accounting the effective tax rate on earning quality, meaning that investors based on after-tax results to assess firms earning quality. Similarly, Arm-strong, Blouin and Larcker (2012) studied the effects of incentives for tax planning on earnings quality. They used accounting the effective tax rate to measure tax aggressiveness to see the effects of tax aggressiveness on earnings quality using regression analysis on firms quoted in the United States. Their results indicate a significant positive effect of accounting the effective tax rate on earn-ing quality.

Huseynov and Klamm (2012) worked on the e tax aggressiveness, tax management and corpo-rate social responsibility. They used S&P 500 firms in the United States (the number of

firms varies between 25 and 425 per year and depends upon the availability of data). They reported that ac-counting the effective tax rate has been a widely used measure of tax aggressiveness because it measures tax aggressiveness relative to accounting earnings. Their result stated a significant posi-tive effect of accounting the effective tax rate on corporate social responsibility indicating higher earnings quality.

Desai and Dharmapala (2006) worked on corporate tax aggressiveness on firm value using the United States firms. They argue that aggressive tax planning reducing tax may not necessarily be beneficial to stockholders and earnings. They used regression analysis to analyze the effect of ac-counting the effective tax rate on earnings quality. Their result shows a significant positive effect of accounting the effective tax rate on earnings quality. They are of the view that corporate tax aggres-siveness transfer resources from the state to shareholders, which is incomplete given the agency problems characterizing shareholder-manager relations. This resources transfer negatively affect earning quality.

Hope, Ma and Thomas (2012) focused on tax aggressiveness and geographic earnings disclo-sure. They employed the current effective tax rate to measure tax aggressiveness while examining the association between corporate tax aggressiveness and geographical earnings' disclosure practic-es based on the United States multinationals. They found a significant positive effect of the current effective tax rate on geographic earnings quality disclosures. Similarly, Lanis and Richardson (2012) worked on the effect of tax aggressiveness on corporate social responsibility. They used regression analysis to analyse the dependent and independent variables using 408 Australian firms. They measured tax aggressiveness using the current effective tax rate on corporate social responsi-bility. Their results show a significant positive effect of the current effective tax rate on corporate social responsibility indicating a high tax rate, which in turn indicates high earnings quality.

Demeré, Lisowsky, Li and Snyder (2017) worked on whether smoothing activities indicate higher or lower financial reporting quality, drawing evidence from effective tax rates. The study used 35,201 firm's yearly observations in the United States, excluding financial, insurance and utility firms, from 1996 to 2012. They used effective tax rate, profitability, size, market-to-book, leverage, research and development expense, net operating loss carry forwards, foreign income-producing activity, intangible assets, mergers and acquisitions, capital intensity, cash holdings and losses as dependent, independent and control variables. They used ordinary least square regression to analyse the dependent and independent variables. Their results show a significant negative effect of the effective tax rate on discretionary accruals, meaning the effective tax rate serves as an indica-tor to financial reporting quality on both reducing and increasing earning quality.

Ayers et al (2009) worked on taxable income as a performance measure.. They used the long-term cash effective tax rate to measure the firms' tax aggressiveness. The study reported that taxable income becomes less informative for high tax aggressiveness firms and more informative for firms with low earnings quality, suggesting that investors, at least in part, are able to distinguish sources of book-tax differences, after using regression analysis to analyse the effect. The results show a significant negative effect of the long-term cash effective tax rate on earnings quality, meaning that taxation is evidence of low earning quality.

Hanlon and Slemrod (2008) focused on what tax aggressiveness signals on earning quality. They used regression analysis to analyse the effect of tax aggressiveness signal on earning quality, calculating the long-term effective tax rate by the cash taxes paid summed over the two years divid-ed by pre-tax income summed over the two years. Their results show a significant negative effect of tax aggressiveness signal on earning quality, meaning that firms stock price declines when there is news about its involvement in tax aggressiveness. The reaction is less negative for firms that are viewed to be generally less tax aggressive.

Hanlon (2005) worked on the effects of tax aggressiveness on earnings management using the United State large firms. The study used regression analysis to analyse long-run cash effective tax rate on persistence and accruals of large firms. The results show a negative effect of tax aggressive-ness on earnings management, stating that large tax aggressiveness, on average, is systematically associated with the quality (persistence, growth) of firm earnings.

Dhaliwal et al. (2011) worked on the effect of corporate tax aggressiveness on firms' valuation using regression analysis to analyse the long-run cash effective tax rate on the valuation of the United State firms. Their results show negative effects of tax aggressiveness on firms' valuation but only for the firms with weak corporate governance structures. Similarly, Frank et al. (2009) focused on the tax reporting aggressiveness on its relation to financial reporting of firm's earnings. Their result shows negative effects of tax aggressive policy on financial reporting. They reported that tax aggressive po-

licy reduces earnings quality of sample firms.

Brad, Sharon and Sonja (2010) worked on how tax aggressiveness of firms influence earning quality, on the basis of the United States private equity ownership on portfolio firms. They examine whether private equity firms influence the extent and types of tax aggressiveness at portfolio firms as an additional source of economic value taking tax saving; cash effective tax rate; book-tax gap as independent variables on firms earning as dependent variable. The result shows a significant nega-tive effect of tax savings on earnings of the private equity ownership firms. They reported that pri-vate equity backed firms pay 14.2 percent less income tax per dollar of adjusted pre-tax income than non-private equity backed private firms, even after controlling for the presence of net operating loss and debt tax shields, which affect earning quality.

Thomas and Zhang (2010) worked on the effects of tax aggressiveness information about core profitability that is incremental to reported earnings and information not reflected in stock prices because tax disclosures are complex and opaque. They analysed the independent and dependent variables, such as tax savings, price momentum, discretionary accruals, size, book-to-market, ratio of tax income to earnings, income effect of changes in effective tax rates using regression analysis to analyse the sample of the United States firms. Their results show positive significant effects of tax savings on the level of earnings. They state that higher tax expense is good news for investors, as the fact that higher tax implies higher earnings. They posit that tax disclosures are not easily dis-covered and investors do not fully appreciate these implications for future earnings and tax expense.

Ftouhi, Ayed and Zemzem (2016) examined whether corporate tax planning behaviour increases the firm value of European countries. They used regression analysis to analyse the effect of tax sav-ings on firm earnings. They reported that the impact of tax planning on firm earnings is a function of tax savings in disclosures of tax reduction in the financial statements. They argue that tax savings affect the value of a firm negatively due to higher agency costs. The result show that the corporate effective tax rate is below the statutory tax rate of the listed firm, meaning that tax taxpayers use tax saving policies to reduce tax liability in obtaining the tax saving benefits while expose to risk related to inspection or investigation by tax authorities.

Hafkenscheid and Janssen (2009) worked on whether income tax savings policies create firms' earnings using content analysis of the theory of tax planning. The study was held in the Nether-lands. They argue that tax planning strategies do create company value, that the value created by tax saving should be calculated separately from the value created by growth of the operating profits. Their results show that many investors and analysts said they disregard tax as a value driver be-cause they lack the relevant information, that firms generally are reluctant to provide information on their tax position, often arguing that this would negatively affect their position toward the taxing authorities.

Guenther, Hu and Williams (2013) worked on the large book-tax gap effects on discretionary accruals on the basis of the United States firms. Their study used annual pre-tax book income, an-nual deferred tax expense, tax book gap to measure tax aggressiveness while discretionary accruals to measure earnings quality. Their results show positive significant effects of tax book gap on earn-ings quality while stating that the large book tax gap will provide helpful information on discretion-ary accruals or earnings quality to investors and tax authorities.

Blaylock, Gaertner and Shevlin (2012) worked on the association between book-tax conformity and earnings management to determine whether managing earning upward lead to high tax and managing tax downwards leads to lower earnings quality. They used panel regression analysis on 141,389 firm annual observations across 35 countries over the period of 1996-2007. They used current tax expense, ratio of foreign pre-tax income to total tax expense, dividend as independent variables. And accrual quality as dependent variable. The results show a significant positive effect of book tax conformity on earnings quality, meaning that high book tax conformity indicates high earnings management which is a signal of low earnings quality.

Diehl (2010) worked on the ratio of deferred tax liabilities to shares as a predictor of stock prices using 3,016 United States companies. They used regression analysis to analyse basic earnings per share, earnings per share, book value per share, deferred tax liabilities per share, retained earnings per share, market capitalisation and number of shares as dependent and independent variables. Their results show a statistical significant effect of tax aggressive planning on earnings quality, indicating that low earnings quality prediction errors are more positive where a large book-to-tax gap exists.

Boise (2005) worked on tax fraud and inflated corporate earnings. They study investigated

whether tax fraud and inflated corporate earnings is an alternative to the missing legislative fix us-ing United States firms with special emphasis on World Com corporation. The study used content analysis to analyze the dependent and independent variables. The results show a significant effect of tax fraud on the quality of firms earning while identifying two indicators as a signal of tax fraud and inflated corporate earnings. A large book tax gap indicates lower earnings quality and tax pay-ment on artificial earnings to hit analysts expected target to maintain the price of the stock.

Seidman (2008) investigated the book tax income gap with factors that affect the gap and details regarding its most significant component. Their study was based on the United States firms from 1993 to 2004. Their dependent and independent variables are accounting rules, earnings manage-ment behaviour, tax law, tax sheltering behaviour, book tax gap and general business conditions. . They study the use of regression analysis to analyse the dependent and independent variables. The results show that temporary tax differences have a significant effect on earnings quality with high R2, indicating wide variations in the permanent tax difference. It is reported that tax sheltering is more significant through permanent tax differences than through temporary tax differences, stating that tax shelters create permanent tax differences. The study disagrees with previous studies that belief that tax shelter was the primary cause of the rise in the book-tax income gap.

Evers, Meier and Nicolay (2016) worked on the implications of the book-tax gap from a meta-analysis point on whether the increased book-tax gap actually reduces earnings quality. The study uses these variables book-tax conformity, book-tax gap, tax sheltering, and earnings management to analyse the dependent and independent variables in the United States. The meta-analysis is to quan-tify the impact of these sources of heterogeneity in the study design with respect to the sign and statistical significance of the association between tax book gap on earnings management, using meta regression analysis as an innovative tool in the empirical accounting literature to clarify the interpre-tation of opposing outcomes and providing guidelines for future studies. Their results show a nega-tive effect of tax book gap on earnings management, which means that a higher tax book gap affects earnings quality.

Abdul Wahab and Holland (2014) worked on the persistence of the book-tax gap using non-financial quoted firms in the United Kingdom from 2005 to 2010. They used the effective tax rate, book tax gap, earning management, current tax expense and deferred tax as dependent and inde-pendent variables while using regression analysis to analyse the effect of the variables. Their results show a significant positive effect of the tax book gap on earnings quality suggesting that taxation is a motivating factor. They reported that the majority of companies' face a lower overseas statutory rate compared to the United Kingdom rate. The ability to maintain the book tax gap effect over time is consistent with an underlying tax motivation, which affects their earnings quality.

Blackburne and Blouin (2016) worked on the understanding of the informativeness of the book-tax gap using 19,129 firms' annual observation on listed firms in the United States from 2001 to 2012. The study used the book tax gap, ratio of deferred tax expense grossed up by the top statuto-ry tax rate to average total assets, temporary tax different and permanent tax different as independ-ent variables. While discretionary accruals as dependent variable. They used counterfactual tests, simulation analyses and multiple regression analysis to analyse the dependent and independent vari-ables. The results show a significant effect of book tax gap on earnings quality indicating that man-agers manipulate book income and taxable income reports because of incentives such as value rele-vance of the report and tax reduction.

Romanus (2007) worked on the impact of earnings quality on investors and analysts' reactions to restating announcements with a major focus using temporary tax different against earnings quali-ty. The study used earnings quality, restatements, book-tax differences, accruals as dependent and independent variables, analyzing cross-sectional data of 719 publicly traded firms that announced restatements between 1997 and 2004 in the United States. The study reported that the log of the absolute value of the total tax difference is used because both large positive and large negative tax differences provide indications of low earnings quality as reported by Hanlon and Krishnan 2005 in Romanus 2007. The result shows that temporary tax differences have a significant negative effect on earning quality, which indicates that large book tax differences have a lesser negative effect on market reaction on earnings quality. However, a temporary tax difference conveys information about the quality of earnings to investors. A temporary tax difference further provides signal to investors that quality of earnings may be problematic, thereby increasing investors' due diligence while suggesting that tax aggressiveness has consequences that extend beyond outcomes.

Raedy, Seidman and Shackelford (2010) worked on book-tax differences, as they matter to equi-ty investors, using 250 United States firms from 1993 to 2007. The study used employee benefits, environmental costs, general business expenses, differences related to foreign income, intangible property differences, inventory differences, leased property differences, differences arising from mergers, acquisitions, divestitures or restructuring, net loss carry forwards, differences related to owned tangible property, items unique to the regulated industries, differences in revenue recogni-tion, state and local taxable income differences, differences related to subsidiaries to capture measures for temporary tax difference on earnings quality as dependent variable. However, they used regression analysis to analyze the impact of the variables. Their results show a significant pos-itive effect on temporary tax difference on earnings quality, which is consistent as the investors favourably view increase and decrease in temporary tax difference. They reported that firms' tax obligations potentially shed information about the quality of firms' earnings. They further state that investors examine the temporary tax difference arising from the accounts where managers enjoy the right to choose in the recognition of income and expenses in respect to the accrual quality of firms.

Blaylock, Shevlin and Wilson (2010) worked on tax avoidance, large positive book-tax differ--ences and earnings persistence, which investigate why temporary tax differences appear to serve as a useful signal of earnings persistence. Their analysis focuses on firms with large temporary tax differences because these differences could be a signal of either earnings management or tax avoid-ance on 21,205 United States firms' annual observations. They used pre-tax book income, pre-tax book income for the current year divided by the average asset, the modified Jones model discretion-ary accruals, cash effective tax rate, temporary tax differences, earnings management to analyse the dependent and independent variables while analyzing the effects with regression analysis. Their result shows a significant positive effect on the temporary tax difference on earnings quality stating that temporary tax differences serve as a useful signal of future earnings, with some cases leading to lower earnings. They reported that despite concerns over the limited information provided to in-vestors in respect to differences between a firm's book and taxable income, they find that investors are able to use the disclosures to look through to the source of temporary tax differences and ascer-tain earnings quality.

Deslandes and Landary (2007) worked on taxable income, tax-book difference and earnings quality. They investigated how taxable income and temporary tax difference affect assessing earn-ings quality. They reported that the gap between temporary tax differences and reported earnings might be an indication of financial statement manipulations and tax aggressiveness behaviour. They used all firms listed at the Toronto Stock Exchange (Canada) for the period of 2000 – 2005. Their variables are earning before taxes, taxable income, total tax differences, temporary tax differences, permanent tax differences, cash flow from operations. Regression analysis was used for analysing the impact of the independent on the dependent variables. Their results show a significant positive effect of temporary tax differences on earning quality, stating that the temporary tax difference helps predicting the firms' future earnings.

Lev and Nissim (2004) worked on taxable income, future earnings and equity values. They as-certain the ability of a tax based fundamental to predict earnings growth and stock returns. The tax fundamental reflects temporary and permanent tax differences as well as tax accruals such as changes in the tax valuation allowance. They used taxable income; deferred taxes; temporary and permanent tax differences, earnings quality; cash flow from operations, earnings management; mar-ket efficiency to analyse the dependent and independent variable with regression analysis. The study used 40,372 United States firms from 1973 to 2000, obtained from the Compustat database. Their results show a significant negative effect of temporary tax differences on earning quality. It suggests that permanent tax differences and temporary tax differences are relevant as deferred taxes for predicting earnings growth. They reported that a decrease in the tax and an increase in the cash flow from operations coefficients appear consistent with a general deterioration in the quality of earnings during the late 1980s and 1990s, according to Lev and Zarowin (1999), in Lev and Nissim (2004), reflecting the increasing importance of permanent tax differences and temporary tax differ-ence indicators in predicting earnings quality. However, they reported that the existence of perma-nent book-tax differences does not change taxable income and tax relative to book income. While permanent differences may either strengthen or weaken the information in taxable income less re-ported earnings, depending on their variability and correlations. The study supported by Dhaliwal et al. (2002), in Lev and

Nissim (2000), documents that changes in the effective tax rate, which are due to permanent differences and tax accruals, have negative effects on firms' incentives to increase reported earnings.

2.3.2. Studies on emerging markets

Salihu et al. (2013) worked on the measures of corporate tax avoidance on the basis of empirical evidence from an emerging economy of Malaysia. They used a long-run cash effective tax rate as the proportion of cash taxes paid to the accounting income before tax, accounting the effective tax rate and current effective tax rate as a measure to tax aggressiveness. They used regression analysis to determine the effects of tax aggressiveness on earnings quality. Their results show a significant negative effect of the current and long-run cash effective tax rate on earning quality, suggesting that the relative information content of taxable income for low earnings-quality firms raised concerns about opportunistic earnings management.

Chen and Chu (2005) worked on a model of tax aggressiveness on internal control and external manipulation on the basis of Malaysia firms. They employed the current effective tax rate to meas-ure tax aggressiveness. They argued that tax aggressiveness leads to loss of internal control. The results show a significant positive effect of tax aggressiveness on internal control that affects earn-ings quality.

Amidu, Yorke, and Harvey (2016) worked on the effects of financial reporting standards on tax avoidance and earnings quality. The study included a sample of 116 firms listed in the Ghana Stock Exchange. The study used the effective tax rate, statutory tax rate and book tax gap as a measure to tax avoidance while the modified Jones model of earnings management as a measure to earnings quality. They used multiple regressive analysis to analyze the dependent and independent variables. The results show a significant effect of tax avoidance on earnings quality. They reported that large firms that engage in manipulations of earnings is not always as a result of tax aggressiveness.

Eko (2013) worked on the income tax rate and earnings management of firms listed on the Indo-nesian Stock Exchange. The study investigated the impacts of the firms' tax savings on manage-ment behaviour in determining earnings quality using financial data from manufacturing firms in the years 2003 – 2009. The independent variables are tax savings, statutory tax rate and effective tax rate. While the dependent variables are performance model and modified Jones model. The study used regression analysis to analyse the independent variables and the dependent variables. The re-sults show a significant negative effect of tax savings on earning quality, stating that management tends to accrue expenses earlier whenever the circumstances are available to minimise tax which affects earning quality. In the same way, revenue may be recognised in later years in order to man-age income and tax savings.

Li (2014) worked on tax-induced earnings management, auditor conservatism and tax enforce-ment on the basis of Hong Kong firms. The study used tax savings, enforcement, effective tax rate, quality high on earning manipulation as a measure to earning quality. The results show a significant negative effect of tax savings on earning manipulation, which means that firms subject to stricter tax enforcement report higher discretionary current accruals than their counterparts when they have incentives to manage earnings downward for current tax savings.

Kawor1 and Kportorgbi (2014) worked on the effect of tax planning on the market performance of firms on the basis of non-financial companies listed in the Ghana Stock Exchange over a period of twelve years. They adopted panel regression to analyse the effect of tax savings, sales growth, firm size, leverage and firm age. Their results show a significant position effect of tax savings and firm earnings, meaning that firms engage in intensive tax planning activities when tax authorities maintain low corporate income tax rates that have a neutral influence on the performance of firms under analysis.

Hu, Cao and Zheng (2015) worked on the effects of aggressive tax planning on earnings quality of 202 firms listed on the Chinese capital market from 2008 to 2010. The study used book-tax dif-ferences and deferred tax expense as proxy to tax aggressive planning, and nonconforming earn-ings management as proxy for earning quality. They used regression analysis to analyse the inde-pendent variables and the dependent variables. The results show a significant negative effect of ag-gressive tax planning on earnings quality, indicating that firms has motivations to some aggressive tax planning strategies to reduce tax liability which affects the quality of earnings.

Ingrid (2017) worked on the effect of book--tax gap and corporate governance disclosure on the quality of earnings using accounting conservatism as moderating variables on the basis of listed companies on the Indonesian Stock Exchange from 2012 to 2014. Their study used a book-tax gap, operating cash flow, firms'

growth as independent variables. The results show a significant effect of book tax gap on earnings quality, indicating that firms with a large book tax gap have lower earning persistence compared to firms with a small book tax gap.

Rafay and Ajmal (2014) worked on the earnings management through deferred taxes recognised under IAS 12 using Pakistani firms. The study examines the calculation of a temporary difference under the IAS 12 and its impact on the firm's earnings valuation. They reported that studies indicate that a temporary difference is a source of opportunistic earnings management, suggesting that be-cause accounting principles give managers more ability than tax authorities, while the decrease in tax paid through deferred tax liabilities is classified as tax aggressiveness. The study used the tem-porary difference, abnormal operating earnings, deferred tax liabilities, earnings quality to measure the dependent and independent variables, while using the regression analysis to analyse the impact of the variables. Their results show a negative effect of the temporary tax difference on earnings quality, meaning that Pakistani investors treat the temporary tax difference negatively, penalizing companies that attempt to manage their earnings through the use of deferred taxes. It also shows that the permanent tax difference has an insignificant effect on earnings quality.

Huang and Wang (2013) worked on the book-tax differences and earnings quality for the bank-ing industry using quoted firms in Taiwan. They concentrated on the banking industry because of the specific accrual models of accounting the discretion in the loan loss provisions. The study ex-amined earnings management on how it is been effected by temporary tax differences. The variables are earnings quality, temporary tax differences, permanent tax differences, large positive book-tax differences, large negative book-tax differences, small book-tax differences, while using regression analysis to analyze them. Their results show that banks with large temporary book tax differences have discretionary loan loss provisions that are greater than banks with small temporary book-tax differences. The paper also finds that large temporary book-tax differences have significant negative effects on earnings quality of the sample than those with small temporary book-tax differences, while it reported no significant effects of permanent book-tax differences on earnings quality.

Waluyo (2016) worked on the relationship between a book-tax gap and earnings growth on the basis of Indonesian manufacturing firms within the period of 2010 – 2014. The study used perma-nent tax differences and temporary tax differences to capture tax aggressiveness of Indonesian firms, while changes in pre-tax income and changes in net income were used to measure earnings quality. The study used the size of firms, return on assets, operating cash flows and accrual income as control variables, while using regression analysis to analyse the effects of the independent varia-bles on the dependent variables. The results show that the permanent tax difference has a significant positive effect on earnings quality while the temporary tax difference has a significant negative ef-fect on earnings quality. He reported that firms with a large temporary tax difference tend to have earnings that are not persistent.

Filho, Martinez and Anunciação (2013) worked on the analysis of the relationship between the components of book tax differences and annual variations in earnings and tax expenses on the basis of 130 companies listed firms in the Brazilian Stock Exchange from 2004 to 2011. They used tem-porary tax differences, permanent tax differences, return on assets, ratio of earnings to stock price as independent variables, and earnings management as a dependent variable. The study used ab-normal working capital accruals as a metric to infer the existence of earnings quality, to see whether this interferes in the relation of permanent tax differences or temporary tax differences with varia-tions in pre-tax earnings and income tax expenses using regression analysis to analyse the varia-bles. Their results show a significant negative effect of temporary tax differences on earnings quali-ty, and a significant positive effect of permanent tax differences on earnings quality. They summa-rised their results that changes in temporary tax differences on the future pre-tax earnings growth and permanent tax differences on the future tax expense are useful for investors and analysts.

Satyawati and Palupi (2017) worked on the influence of book tax differences on the correlation of current earnings, accruals and cash flows with future earnings on the basis of 147 registered firms listed on the Indonesian Stock Exchange from 2007 to 2011. Their study used pre-tax book income, large negative temporary tax differences, large positive temporary tax differences and earn-ings before tax of the current period to measure the independent and dependent variables, while using regression analysis to analyse the effects between the variables. Their results show that large negative temporary tax differences are insignificant and do not affect the accounting earnings, which means that firms with large negative temporary tax differences may not be able to realise their

future earnings. Secondly, large temporary tax differences have a positive significant effect on earnings quality, meaning that firms with large positive temporary tax differences will persist to low tax returns due to their accrual, which affects their earnings quality.

In summary, Salihu et al (2013), Dyeng et al (2010), Armstrong, Blouin and Lariker (2012) concentrated on the effective tax rate without capturing the effects of temporary and permanent tax different. Desai and Dharmapala (2006) argued that tax aggressiveness may not necessarily benefit stockholders and earnings. Hope, Ma and Thomas (2012), Richardson (2012), Chen and Chu (2005), Adhikari, Derashid and Zabg (2005) reported positive effects of tax aggressiveness on earnings quality while Ayres et al (2009), Hanlon and Slemord (2008) reported negative effects of tax aggressiveness on earnings quality. Ratay and Ajmal (2014) are of the view that the temporary difference of tax shelter is a source of opportunistic earning management, saying that accounting principles give managers more ability than tax authorities, while Marques, Costa and Silva (2015) captured the usefulness of tax book gap on one measure of earnings quality (earnings per share). Huang and Wang (2013), Romanus (2007), Raedy, Seidman and Shackelford (2010), Blaylock, Shevlin and Wilson (2010) used the modified Jones model to capture discretionary accruals while Warsharsky (2012) brought in the earnings manipulation model by Professor Beneish as analytical tools for earnings quality. Most of these prior studies were done in developed countries such as the United States and European countries, as well as in emerging economies, like Indonesia, Ghana and others.

3. Methodology

3.1. Research design

The study is an ex post facto design. We used secondary data by obtaining financial information covering the selected quoted companies from 2009 to 2016. The data were obtained from the annual reports of the firms. The selection of the variables (regress and regressor) is primarily guided by the results of the previous empirical studies and the available data. Our population comprises 165 firms ranging from agriculture, conglomerate, construction/real estate, consumer goods, health care, in-formation communication technology (ICT), industrial goods, natural resources, oil and gas, ser-vices and financial services (Nigerian Stock Exchange, 2017). While the sample size consists of 116 quoted companies excluding financial services firms due to their nature of financial reporting.

3.2. Model Specification and Measurement of Variables

In specifying our panel regression model of the effects of tax sheltering on earnings quality, our major variables are the cash effective tax rate (CashETR), long term effective tax rate (Longter-mETR); tax savings (TaxSav); book tax gap (BTG); temporary difference (TemDiff) and perma-nent difference (PerDiff). Also included in the model are cross-section and years in the panel re-gressions.

In the light of the above, we measure earnings quality for the study to be based on the method used by Marai1 and Pavlović (2014), Warshavsky (2012), Kamarudin, and Ismail (2014), Healy (1985), DeAngelo (1986) and Jones (1991), Dechow et al. (1995), Hermanns (2006), Francis, LaFond, Olsson, and Schipper (2004), Aboody, Hughes, and Liu (2005), Myers, Myers and Omer (2003), Lyimo (2014), Perotti and Wagenhofer (2011). Scholars have widely employed earnings management as a proxy for earnings quality, particularly in valuing public companies.

One of the most popularly used method to calculate earnings management is the modified Jones model, which presents that total accrual changes may be predicted by the use of explanatory varia-bles, which arise in some way from the organization's economic position (non-discretionary accru-als) without earnings manipulation. However, taking into account the fact that total accrual changes may result from discretionary accrual changes. The model estimates firms' abnormal accruals (dis-cretionary) based on certain activities and accounting fundamentals using time series regression as total accruals to the change in sales and the level of gross property, plant and equipment. The resid-uals of the model are considered as abnormal or discretionary accruals as they are not explained by the firm's economic conditions. Total Accruals = Non-Discretionary Accruals + Discretionary Ac-cruals

3.3. Tax aggressiveness vs. modified Jones Model (Earning quality)

We proxy earnings quality with the modified Jones model which examines how tax sheltering influences earnings quality of selected quoted firms in Nigeria.

The panel regression with an error term (μ_i) for model 1 is expressed in equation (1)

$ModifiedJones_{it}$ = f (CashETR + LongtermETR + TaxSav + BTG + TemDiff + PermDiff) equ (1)

$ModifiedJones_{it} = \alpha_i + \beta_1 CashETR_{it} + \beta_2 longtermETR_{it} + \beta_3 TaxSav_{it} + \beta_4 BTG_{it} + \beta_5 TemDiff_{it} + \beta_6 PermDiff_{it} + \mu_i$ equ (2)

where: α_i = constant, EM_{it} = earnings management, CashETR $_{it}$ = cash effective tax rate, LngtermETR $_{it}$ = long-term cash effective tax rate, $TaxSav_{it}$ = tax savings, BTG $_{it}$ = book tax gap, $TemDiff_{it}$ = tem-porary difference of tax shelter, $PermDiff_{it}$ = permanent difference of tax shelter, μ_{it} = error terms

The apriori sign;

$\beta_1 < 0, \beta_2 < 0, \beta_3 < 0, \beta_4 > 0, \beta_5 < 0, \beta_6 < 0 \leq 0$

Dependent Variables

MJM = modified Jones model. We proxy earnings management with the modified Jones model. The model estimates firms' abnormal accruals (discretionary) based on certain economic and ac-counting fundamentals using time series regression used by Dechow, Ge and Schrand (2010), Dechow and Dichev (2002). $\mu_t = DA_t = \{TA_t\} - \{(\beta_{oi} (1/T_{t-1}) + \beta_{1i} (\Delta REV_t - \Delta REC_t) + \beta_{2i} (PPE_t)\}$

where: DA_t = Discretionary accruals in year t, TA_t = Actual total accruals from financial statement data = {Δ Current assets – Δ cash – Δ current liabilities – Δ Current maturities of long-term debt – Δ Income taxes payable - Depreciation and amortisation expenses}, ΔREV_t is the change in revenues from last year to this year, ΔREC_t is the change in receivables from last year to this year, PPE_t is the book value of property, plant and equipment.

The model measures the firm's operations before managers' manipulations. It is expected that total accruals, which include changes in accounts receivables, rely on the extent of changes in revenue, as revenues are to control the firms economic environment, gross property, plant and equipment control for the portion of total accruals related to non-discretionary depreciation expense. The pre-diction error in the model, μt measures the level of discretionary accruals.

Independent Variables

CashETR = cash effective tax rate, following Salihu et al. (2013), Chen et al. (2010) Dyreng et al. (2010). It is computed as the total tax expenses divided by the income before tax, reflecting the ag-gregate proportion of the accounting income payable as taxes. It captures tax aggressiveness as it relates to accounting earnings. The apriori sign is $\beta_1 < 0$

LngtermETR = long term effective tax rate: following Chen et al. (2010); Dyreng et al. (2010); Minnick and Noga (2010); Kim, Li and Zhang (2011); Salihu et al. (2013); the long-run cash effec-tive tax rate is the proportion of cash taxes paid to the accounting income before tax. It helps to min-imize the likely effects of items such as valuation allowance and tax cushions. The long-run cash effective tax rate also uses the tax information for multiple years (say 3-10 years, Hanlon and Heit-zman, 2010, p. 140, in Salihu et al., 2013) which helps to eliminate the volatility in the annual level measures. Volatility in tax aggressiveness measurement is mostly caused by the timing differences between the treatments of certain items under financial and tax accounting (otherwise known as temporary difference). The apriori sign is $\beta_2 < 0$

$TaxSav_{it}$ = tax savings: following Ilaboya, Izevbekhai and Ohiokha (2016), Ftouhi, Ayed and Zemzem, (2010); Kawor and Kportorgbi (2014), Lisowsky, Lennox and Pittman (2013), Atwood and Reynolds (2008), tax savings are calculated as a difference between the statutory tax rate and the effective tax rate (TaxSav = 30% - ETR). Where a firm operates across a number of jurisdic-tions with varying statutory rates, tax rate differentials can provide tax savings recognized in earn-ings quality. The apriori sign is $\beta_3 < 0$

BTG $_{it}$ = book tax gap: following Seidman (2008); Talisman (1999); Mills, Newberry and Tra-utman (2002); Desai (2003); Waluyo (2016); Plesko (2004), in Satyawati and Palupi (2017), the book tax gap is calculated as the differences between the income reported on financial statements and the income reported on tax returns (i.e. book income less taxable income) (BTG = EBIT – TI). Taxable income is calculated as current tax expense divided by the corporate statutory rate (30%). We used the book tax gap to measure the abusive tax aggressiveness behaviour of the sample – quoted firms. The apriori sign is $\beta_4 > 0$

$TemDiff_{it}$ = temporary difference of tax shelter: following Seidman (2008); the temporary differ-ence of tax shelter is calculated as deferred tax expense divided by the corporate statutory rate (de-ferred tax / 30%). We used it to measure how temporary differences affect earning management because of the nature of most methods used on earnings due to a time difference that reverses in the near future. The apriori sign is $\beta_5 < 0$

$PermDiff_{it}$ = permanent difference of tax shelter: following Seidman, (2008); the permanent differ-ence of tax shelter is calculated as a book tax gap less temporary tax differences (BTG - . TemDiff) where BTG = book income less taxable income, and TemDiff = deferred tax / 30%. We used per-manent tax differences as a measure to tax aggressiveness because permanent tax differences strive to permanently reduce tax, rather than delay tax payment. The apriori sign is $\beta_6 < 0$.

Table 1: Dependent and independent variables

Nature of variables	Name of variables	Measurement of variables	Expectation sign
Dependent variables	modified Jones model	$DAt = \{TA_t\} - \{(\beta_{oi}(1/T_{t-1}) + \beta_1 i(\Delta REV_t - \Delta REC_t) + \beta_2 i(PPE_t)\}$	
Independent variables	CashETR	Total tax expenses divided by the income before tax	-
	LngtermETR	Total tax expenses divided by the income before tax; uses the tax information for multiple years	-
	TaxSav	The difference between the statutory tax rate and the effective tax rate (TaxSav = 30% - ETR).	-
	BTG	Differences between the income reported on financial statements and the income reported on tax returns. BTG = EBIT – TI). Taxable income is calculated as current tax expense divided by the corporate statutory rate (30%)	+
	TemDiff	Deferred tax expense divided by the corporate statutory rate (deferred tax / 30%)	-
	PermDiff	A book tax gap less temporary tax differences (BTG - . TemDiff)	-

Source: own study.

4. Data presentation and analysis

To ensure adequate observation for statistical testing, we adopted a panel data analysis to identify the possible effects on earnings quality. We conducted descriptive statistics and the correlation ma-trix. Pooled and panel regression with fixed and random effect panel data regression as well as the Hausman test were also conducted to select between fixed and random effect models.

Table 2 from appendix one shows the mean (average) for each of the variables, their maximum values, minimum values, standard deviation and Jarque-Bera (JB) statistics (normality test). The results in table 2 provided some insight into the nature of the quoted firms used in the study. First-ly, the large difference between the maximum and minimum values of the modified Jones model shows that the quoted firms have different discretionary accruals (earnings management). Secondly, it has been observed that on average, over the eight--year period (2009 – 2016), 52% mean of the modified Jones model indicates high earnings management of quoted firms. We also observed that the modified Jones model over the period was 2.0305 maximum, with minimum running at -7.2899. This shows that the quoted firms have different discretionary accruals (earnings manage-ment). Thirdly, we also find out that on average, 16% tax rate was paid by firms on their earned income while on the long run, 68% tax rate was paid by firms on their earned income. Tax saving stood at 13%. The book tax gap was N1,752,912, leading to N76,592,962 on the temporary tax difference accumulated due to the accrual method of earnings manipulation by the quoted firms. Lastly, the Jarque-Bera (JB) test, which tested for normality or the existence of outliers are normal-ly distributed at 1% level of significance. This means that any variables with outliers are not likely to distort our conclusion, and therefore are reliable for drawing generalizations.

In examining the relationship among the variables, we employed the Pearson correlation coeffi-cient (correlation matrix) and the results are presented in table 3.

The use of the correlation matrix in most regression analyses is to check for multicolinearity and to explore the association between each explanatory variable and the dependent variable. Table 3 focuses on the correlation between earnings quality (modified Jones model), tax aggressiveness (CashETR, LongtermETR, TaxSav, BTG, TemDiff, PermDiff).

The findings from the correction matrix table show that cash ETR (CashETR, modified Jones model = 0.0059) was positive and weakly associated with the modified Jones model. This suggests that increase on cash ETR indicate high earnings quality of quoted firms. Long term ETR shows a weak positive and negative association with earnings quality (0.0052, -0.0077 and -0.0005) indicat-ing that on the long run, the proportion of tax paid out of accounting income affects high and low earnings quality of the quoted firms. Tax savings show a negative association with earnings quality (-0.0075, -0.0433, -0.0011) indicating that an increase in tax sheltering is a signal of low earnings quality of the quoted firms. The book tax gap shows strong and weak associations with earnings quality (0.0622, 0.0598, -0.0093), meaning that the book tax gap negatively or positively affects earnings quality.

Table 2: Data Description and Analysis

Descriptive Statistic					
Variables	Mean	Max	Min	Std. Dev	JB (P-Value)
ModifiedJonesModel	0.5200	2.0305	-7.2899	0.3524	1744223 (0.00)*
CashETR	0.1681	41.0839	-90.8830	3.5145	10328480 (0.00)*
LngtermETR	0.6875	504.8176	-13.3025	16.9360	28888007 (0.00)*
TaxSavings	0.1345	91.1830	-40.7839	3.5069	10507138 (0.00)*
BTG	1,752,912	2.1900	-36,503,027	16,144,385	255599.7 (0.00)*
TemDiff	76,592,962	3.4200	-4.5500	1.5000	7632413 (0.00)*
PermDiff	-74,638,687	4.5500	-3.4000	1.4900	7629798 (0.00)*
No of Cross-section	113				
All data observations	891				

Note: *1% level of significance, ** 5% level of significance and ***10% level of significance
Source: Author (2018).

Table 3: Correlation Matrix

Correlation							
Variables	ModJone-sMod	CashETR	Lngter-mETR	TaxSav	BTG	TemDiff	Permiff
ModJones	1.0000						
CashETR	0.0059*	1.0000					
LngtermETR	0.0052*	0.0043*	1.0000				
TaxSav	-0.0075*	-0.0997***	-0.0041*	1.0000			
BookTaxGap	0.0622***	-0.0072*	-0.0049*	0.0072*	1.0000		
TemDiff	0.0073*	-0.0032*	-0.0020*	0.0032*	0.5884	1.0000	
PermDiff	-0.0068*	0.0031*	0.0019*	-0.0031*	-0.5816	-0.0999***	1.0000

Note: *1% level of significance, ** 5% level of significance and ***10% level of significance
Source: Author (2018).

Checking for multicolinearity with the use of the variance inflation factor, we notice that no two explanatory variables were perfectly correlated, as the VIF mean was 1.168, which is much lower than the threshold of 10. This means that there is the absence of multicolinearity problem in our model. Multicollinearity between the explanatory variables may result wrong signs or implausible magnitudes, in the estimated model coefficients, and the bias of the standard errors of the coeffi-cients.

However, to examine the effect on the dependent variables earnings management and tax shelter-ing and to test our formulated hypotheses, we used a panel data regression analysis, since the data had both time series (2009 – 2016) and cross-sectional properties (115 quoted firms). The panel regression results are presented and discussed below.

In testing for the cause-effect between the dependent and independent variables in the modified Jones model (earnings management), we reported pooled and panel analyses. The study adopted pooled and panel data regression models (fixed effect and panel data estimation techniques). The difference in these models is based on the assumptions made about the explanatory variables and the cross-sectional error term.

In table 4, we presented OLS pooled regression and two panel data estimation techniques (fixed effect and panel data estimator). The three results revealed differences in their coefficients magni-tude, signs and number of significant variables. This clearly shows that the pooled OLS regression does not reflect the heterogeneity in the sampled companies. This effect is reflected in the two panel data regression results. Selecting from the two panel data models, the Hausman test was conducted, and the result (less than 5% or 0.05) shows that we should accept Ho (adopt the fixed effect model and reject the random effect model). This means that we adopt the fixed effect panel data regression results. The R squared value was 0.51, but the adjusted R squared was 0.09 doubting the goodness of fit of the model. However, we employed a panel generalised method of moments because we suspected there are a variety of moment conditions that are deduced

from the assumption of the theoretical model. When the number of moment conditions is greater than the dimension of the pa-rameter vector θ, the model is said to be over-identified. Over identification allows us to check whether the model's moment conditions match the data well or not. Conceptually we can check whether ḿ (Õ) is sufficiently close to zero to suggest that the model fits the data well. If the J-stat is 0, the model is good. If the model correctly describes the data, then $1N\sum Nt=1g$ $(Xi,\theta\hat{})$ will be very close to 0.

Table 4: Modified Jones Model Panel Regression Result

	Aprior Sign	ModiJonesModel (OLS Pooled)	ModiJonesModel (Fixed Effect)	ModiJonesModel (Random Effect)	ModiJonesModel (GMM)
C		0.01	0.00	0.00	0.04
		(0.46)	(0.14)	(0.37)	(0.66)
		[0.63]	[0.88]	[0.70]	[0.50]
CashETR	-	-0.03	-0.02	-0.20	-0.10
		(-0.61)	(-0.45)	(-0.56)	(-0.19)
		[0.54]	[0.65]	[0.57]	[0.84]
LngtermETR	-	0.00	1.51	8.04	-0.00
		(0.17)	(0.02)	(0.11)	(-0.02)
		[0.86]	[0.98]	[0.90]	[0.98]
TaxSavings	-	-0.30	-0.02	-0.02	-0.15
		(-0.62)	(-0.42)	(-0.56)	(-0.52)
		[0.53]	[0.67]	[0.57]	[0.60]
BookTaxGap	+	3.72	5.85	4.56	1.19
		(1.33)	(1.98)	(1.64)	(1.05)
		[0.18]	[0.04]**	[0.09]***	[0.09]***
TemporaryDiff	-	-1.82	-1.90	-2.22	-1.17
		(-0.66)	(-0.32)	(-0.80)	(-0.04)
		[0.50]	[0.74]	[0.42]	[0.96]
PermanentDiff	-	-1.81	-1.07	-2.21	-1.17
		(-0.66)	(-0.31)	(-0.80)	(-0.04)
		[0.50]	[0.75]	[0.42]	[0.96]
R-Squared		0.20	0.51	0.27	0.28
Adj-R-Squared		-0.00	0.09	0.00	0.29
F-Statistic		0.89(0.49)	1.75 (0.00)*	1.09 (0.36)	
Hausman Test				6(0.01)*	
J Statistic					0.00*
N(n)		892(115)	892(115)	892(115)	772(115)

Note: (1) Parentheses ( ) are t-statistic while brackets [ ] are p-values; (2) * 1%, ** 5% and *** 10% level of significance
Source: own study based on the data from the Notoria database.

Following the above, we will therefore discuss the panel generalised method of moments regres-sion results from Table 4. In Table 4, the R-squared and adjusted R-squared values were (0.28) and (0.29). This indicates that all independent variables jointly explain about 28% of the systematic var-iations in the modified Jones model of our sampled companies over the eight-year period (2009 – 2016). The above average R-squared value is realistic as it clearly shows earnings quality and its interaction with tax sheltering. The J-statistics 0.00 shows that the model is best fit.

In addition to the above, the specific finding from each explanatory variable from the panel gen-eralised method of moments regression model is provided as following:

Cash effective tax rate (CashETR), based on the coefficient of -0.10 and p-value 0.84 appears to have a negative influence on our sampled quoted companies, earnings management (modified Jones model) and was statistically insignificant at above 10% since its p-value was greater than 0.10. Therefore, this result suggests that we should accept hypothesis one (H01), which stated that the cash effective tax rate does not significantly affects earnings quality. This means that an increase in the cash

effective tax rate of the sampled quoted companies indicates lower earnings quality of the firms. With negative influence on earnings quality and conform to apriori expectation. These find-ings, like similar studies by Frank, Lynch and Rego (2009); Salihu et al. (2013); Demeré, Lisowsky, Li and Snyder (2017), confirm the negative effect of tax sheltering on earnings quality, suggesting that the cash effective tax rate serves as an indicator of financial reporting quality on both reducing and increasing earning quality.

Long-term effective tax rate (LngtermETR), based on the coefficient of -0.00 and p-value 0.98 appears to have a negative influence on our sampled quoted companies, earnings management (modified Jones model) and was statistically insignificant at above 10%, since its p-value was greater than 0.10. Therefore, this result suggests that we should accept hypothesis two (H02), which stated that the long term effective tax rate does not significantly affect earnings quality. This means that an increase in the long term effective tax rate of the sampled quoted companies indicates a reduction in earnings quality of the firms on the long run. With a negative influence on earnings quality. These findings like similar studies by Ayers et al (2009); Hanlon and Slemrod (2008); Sa-lihu et al. (2013); Hanlon (2005); Dhaliwal et al. (2011) confirm the negative effect of the long term effective tax rate on earnings quality suggesting that taxation is evidence of low or high earnings quality.

Tax savings (TaxSavings), based on the coefficient of -0.15 and p-value 0.60, appear to have a negative influence on our sampled quoted companies, earnings management (modified Jones mod-el) and was statistically insignificant at above 10%, since its p-value was greater than 0.10. There-fore, these results suggest that we should accept hypothesis three (H03), which stated that tax sav-ings do not significantly affects earnings quality. This means that an increase in tax savings of the sampled quoted companies reduces earnings quality of firms. With a negative influence on earnings quality. These findings, like similar studies by Eko (2013); Brad, Sharon and Sonja (2010); Li (2014), confirm the negative effect of tax savings on earnings quality suggesting that management tends to accrue expenses whenever circumstances available to minimise tax.

Book tax gap(BTG), based on the coefficient of 1.19 and p-value 0.09 appears to have a positive influence on our sampled quoted companies, earnings management (modified Jones model) and was statistically significant at 10%, since its p-value was lesser than 0.10. Therefore, these results suggest that we should reject hypothesis four (H04), which stated that the book tax gap does not significantly affect earnings quality. This means that an increase in the book tax gap of the sampled quoted companies indicates high earnings management, which affect the quality of the firm's earn-ings. With a positive influence on earnings quality. These findings, like similar studies by Guen-ther, Hu, and Williams (2013); Blaylock, Gaertner, and Shevlin (2012); Diehl, (2010); Seidman (2008); Abdul Wahab and Holland (2014), confirm the positive effect of the book tax gap on earn-ings quality, suggesting that book tax gap will provide helpful information on discretionary accruals or earnings quality to investors and tax authorities.

Temporary tax different (TemporaryDIFF), based on the coefficient of -1.17 and p-value 0.96 appears to have a negative influence on our sampled quoted companies, earnings management (modified Jones model) and was statistically insignificant at above 10%, since its p-value was greater than 0.10. This Therefore, these results suggest that we should accept hypothesis five (H05), which stated that temporary tax difference does not significantly affect earnings quality. This means that an increase in the temporary tax difference of the sampled quoted companies indicates lower earnings quality. With a negative influence on earnings quality. These findings, like similar studies by Rafay and Ajmal (2014); Marques, Costa and Silva (2015); Huang and Wang (2013); Romanus (2007), confirm the negative effect of the temporary tax difference on earnings quality, suggesting that investors treat temporary tax difference negatively, penalising companies that attempt to manage their earnings through the use of deferred taxes, which negatively affects earnings quality.

Permanent tax different (PermanentDIFF), based on the coefficient of -1.17 and p-value 0.96 appears to have a negative influence on our sampled quoted companies, earnings management (modified Jones model) and was statistically insignificant at above 10%, since its p-value was greater than 0.10. Therefore, these results suggest that we should accept hypothesis six (H06), which stated that the permanent tax difference does not significantly affect earnings quality. This means that an increase in the permanent tax difference of the sampled quoted companies indicate lower earnings quality. With a negative influence on earnings quality. These findings, like similar studies by Rafay and Ajmal (2014); Lev and Nissim 2004, confirm the negative effect of the per-manent tax difference on earnings quality. This is be-

cause permanent tax difference do not give rise to deferred tax assets or deferred tax liabilities. It does not change taxable income and tax relative to book income. However, it may either strengthen or weaken the information in taxable income less reported earnings, depending on their variability and correlations.

5. Conclusion and recommendations

The study has revealed that the cash effective tax rate, long term effective tax rate, tax savings, temporary and permanent tax differences are insignificant with the quoted companies in Nigeria. It means that stakeholders are interested in companies that produce quality financial reports, which clearly shows that there are high earnings manipulations among Nigerian quoted companies, as most firms manipulate earnings through abnormal accruals. It is attributed to the pressure which Nigerian companies face in maintaining the existing investors' confidence, smooth income over the years. While the significant effects of the book tax gap on earnings quality show that an increase or decrease in the book tax gap is a signal to high or low earnings quality. These reactions were differ-ent in developed economies, like the United States as the cash effective tax rate, long-term effective tax rate, tax savings, book tax gap and temporary differences are significant where news about in-volvement in tax aggressiveness affects the firm's earnings quality.

However, this study recommends that investors and business managers in Nigeria access the book tax gap to find out the quality of earnings in a firm before investing. Although as investors are looking for higher return, an increase in the tax book gap might give investors higher returns, a continuous study in this area will help more to discover the extent to which the stated variables in-fluence the firms' earnings.

References

Abdul Wahab N. S. & Holland K. (2014) The Persistence of Book-Tax Differences. British Accounting Review 47(4), 339 - 350. doi: 10.1016/j.bar.2014.06.002

Aboody, D., Hughes, J., & Liu, J., (2005). Earnings Quality, Insider Trading, and Cost of Capital. Journal of Accounting Research 43, 651- 673.

Adhikari, A., Derashid, C., & Zhang, H. (2006). Public policy, political connections, and effective rate rates: longi-tudinal evidence from Malaysia. Journal of Accounting and Public Policy, 25(5), 574-595.

Agundu, P. U. & Akeem, S. (2017) Tax Aggressiveness and Corporate Social Responsibility Fluidity in Nigeria Firms. JORINDISCI, 312 – 319.

Amidu, M., Yorke, S. M. & Harvey, S. (2016). The Effects of Financial Reporting Standards on Tax Avoidance and Earnings Quality: A Case of an Emerging Economy. Journal of Accounting and Finance 16 (2) 129 – 15.

Armstrong, C. S., Blouin, J. L., & Larcker, D. F. (2012). The incentives for tax planning. Journal of Accounting and Economics, 53(1-2), 391-411.

Atwood A, Michael S. Drake. B, Linda A. & Myers C, (2010), Book-Tax Conformity, Earnings Persistence and the Association between Earnings and Future Cash Flows, Journal of Accounting and Economics, 50(1) 111–125.

Atwood, T. J., & Reynolds, J. K. (2008). The pricing of realised tax benefits from NOL carry forwards: Effect of income statement presentation. Journal of the American Taxation Association, 30(1), 1-27. http://dx.doi.org/10.2308/jata.2008.30.1.1

Ayers B. C., Jiang J. X, & ,Laplante S. K. (2009) Taxable Income as a Performance Measure: The Effects of Tax Planning and Earnings Quality. Contemporary Accounting Research 26 (1) 15–54.

Bernasconi, M. & Zanardi, A., (2004). Tax evasion, tax rates, and reference dependence. FinanzArchiv: Public Finance Analysis, Mohr Siebeck, Tübingen, 60 (3) 422-445.

Blackburne T. and Blouin, J. (2016) Understanding the Informativeness of Book-Tax Differences. Notre-Dame Ac-counting Research Conference. 1 – 56.

Blaylock B., Gaertner F. B. & Shevlin, T (2012) The Association between Book-tax Conformity and Earnings Management. Journal of Accounting and Economics, 1 – 34.

Blaylock B., Shevlin T. & Wilson R. (2010) Tax Avoidance, Large Positive Book-tax Differences, and Earnings Persistence. Working paper, Paul Pigott/PACCAR Professor of Business Administration University of Wash-ington Foster School of Business. Electronic copy available at: http://ssrn.com/abstract=1524298.

Boise, C. M. (2005) Tax Fraud And Inflated Corporate Earnings: Is There An Alternative To The Missing Legisla-tive Fix? Tax Analysts Doc 23621, 1 – 15.

Brad B., Sharon P. K. & Sonja O. R. (2010). The Impact of Private Equity Ownership on Portfolio Firms' Corpo-rate Tax Planning. Workshop participants at the 2009 Information, Markets & Organization Conference at Harvard Business School.

Cahan, F. S., Emmanuel, D & Sun, J. (2009) The effect of Earnings quality and country level Institutions on the value relevance of earnings, Review of Quantitative Finance Accounting, 33, 371-391.

Canada Revenue Agency. (2013). Aggressive tax planning. December 23, 2013. http://www.cra-arc.gc.ca/gncy/lrt/vtp-eng.html.

Chan, C. K., Jegadeesh, N. & Lakonishok, J. (2006) Earnings Quality and Stock Returns", Journal of Business, 79(3) 1041-82.

Chen, K. P. & Chu, C. (2005). Internal control vs. external manipulation: a model of corporate income tax evasion. RAND Journal of Economics, 36, 151-164.

Chen, S., Chen, X., Cheng, Q. & Shevlin, T., (2010). Are family firms more tax aggressive than non-family firms? Jour-nal of Financial Economics, 95: 41-61.

Companies Nigeria. Review of Contemporary Business Research 3, 99 – 114.

Dechow, P, Ge, W & Schrand, C. (2010) Understanding earnings quality: A review of proxies, their determinants and their consequence, Journal of Accounting and Economic, 50(2-3) 344-401.

Dechow, P. M. & Dichev I. D. (2002): The Quality of Accruals and Earnings: The Role of Accrual Estimation Er-rors, The Accounting Review, 77, 35-59.

Demeré P., Lisowsky, P, Li Y. L., & Snyder, R. W. (2017) Do Smoothing Activities Indicate Higher or Lower Financial Reporting Quality? Evidence from Effective Tax Rates. EIASM Conference on Current Research in Taxation, 1 – 51.

Desai, M. A. & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. Journal of Financial Economics, 79, 145-179.

Desai, M. A., (2003). The Divergence between Book and Tax Income, Tax Policy and the Economy, 17, 169-206 (ed. J. Poterba).

Deslandes M. & Landary S. (2007) Taxable income, tax-book difference and Earnings Quality. HEC Montreal 3000 ch cote ste-catherine, Montreal, QC, Canada H3T.

Dhaliwal, D. S., Huang X. S., Moser J, W., & Pereira R. (2011). Corporate tax avoidance and the level and valua-tion of firm cash holdings. Available at SSRN: http://ssrn.com/abstract=1905076.

Dhami S. & Al-Nowaihi A., (2007) .Why do people pay taxes: Expected utility versus prospect theory.

Dichev, I., Graham J., Harvey C. R. & Rajgopal, S. (2012) Earnings Quality: Evidence from the Field. Working paper. 1 – 74.

Diehl, K. A. (2010) Ratio of Deferred Tax Liabilities to Shares as a Predictor of Stock Prices. Accounting & Taxa-tion 2(1) 95 – 105.

Dyreng, S. D., Hanlon M., & Maydew E. L. (2010). The effects of executives on corporate tax avoidance. Account-ing Review, 85 (4) (07): 1163-89.

Eko S., (2013), Income Tax Rate and Earnings Management of Firms Quoted On the Indonesian Stock Exchange. Journal of Business and Policy Research. 8(1)78 –89

Evers M. T, Meier I. & Nicolay K. (2016) The Implications of Book-Tax Differences: A Meta-Analysis. Discussion Paper No. 17-003. http://ftp.zew.de/pub/zew-docs/dp/dp17003.pdf

Filho F. R.,Martinez A. L. & Anunciação E. P. (2013) Analysis Of The Relationship Between The Components Of Booktax Differences And Annual Variations In Earnings And Tax Expenses. XXXVII Encontro da ANPAD. Rio de Janeiro Rj – 7a 11.

Francis B., Hasan I., Wu Q. & Yan, (2014) "Are Female CFOs Less Tax Aggressive? Evidence from Tax Aggres-sive-ness," Journal of the American Taxation Association, 36 (2), 171-202.

Francis, J, Lafond, R., Olsson, M, P, & Schipper, K. (2004) Cost of capital and Earnings Attribute, The Account-ing Review, 79(4) 969-1010.

Frank, M. M., Lynch, L. J. & Rego, S. O. (2009). Tax reporting aggressiveness and its relation to aggressive finan-cial reporting. The Accounting Review, 84, 467-496.

Ftouhi, K. Ayed, A. & Zemzem, A. (2016) Tax planning and firm value: evidence from European companies. 2nd International Conference on Business, Economics, Marketing & Management Research. International Journal Economics & Strategic. Management of Business Process. 4.

Guenther D. A., Hu X., & Williams B. M. (2013) Are Large Book-Tax Differences Related to Discretionary Accru-als? Universities of British Columbia-Oregon-Washington accounting conference.

Gupta, S., & Newberry, K. (1997). Determinants of the Variability in Corporate Effective Tax Rates: Evidence from Longitudinal Data. Journal of Accounting and Public Policy, 16, 1-34.

Gwenola, T., (2012) Solving the Yitzhaki Paradox: Income Tax Evasion and Reference Dependence under Prospect Theory. Working Papers<halshs-00793664>

Hafkenscheid, R. & Janssen, C. (2009) Does Income Tax Planning Create Value? The Tax Executive, 351 – 357.

Hanlon M & Slemrod J (2009) What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. Journal of Public Economics 93, 126–141.

Hanlon, M. (2005). The persistence and pricing of earnings, accruals and cash flows when firms have large book-tax differences. The Accounting Review 80 (1): 137–66.

Hanlon, M. & Heitzman S. (2010). A review of tax research. Journal of Accounting & Economics 50 (2-3) 127-78.

Hermanns, S., (2006). Financial Information and Earnings Quality: A Literature Review. SSRN Working Paper Series.

Hoffman, W. H. (1961). The theory of tax planning. Accounting Review. 36 (2) 274-281.

Hope, O. K., Ma, M. S., & Thomas, W. B. (2012). Tax avoidance and geographic earnings disclosure. University of Toronto and University of Oklahoma Working paper.

Hu, N,Cao, Q. & Zheng, L (2015) Quoted Companies' Income Tax Planning and Earnings.

Huang, D., Wang, C. & Hou, C. (2012) Book-Tax Differences and Earnings Quality for the Banking Industry: Evidence from Taiwan. Pacific Accounting Review 1- 28.

Huang, D.F., Wang, C.L. (2013), "Book-tax differences and earnings quality for the banking industry: evidence from Taiwan", Pacific Accounting Review, 25 (2), 145 – 164.

Huseynov, F., & Klamm, B. K. (2012). Tax avoidance, tax management and corporate social responsibility. Jour-nal of Corporate Finance, 18(4), 804-827.

Ilaboya O. J, Izevbekhai M. O. & Ohiokha F. I (2016) Tax Planning and Firm Value: A Review of Literature. Busi-ness and Management Research 5(2), 81-91.

Ingrid, P. (2017) The Effect of Book-Tax Differences and Corporate Governance Disclosure on the Quality of Earnings Using Accounting Conservatism as Moderating Variables. International Journal of Business, Economics and Law. 13 (1) 32 – 37.

Journal 52 753-764.

Journal of Economic Behaviour and Organization 64 171-192.

Kamarudin, A. K. & Ismail W. A. (2014), Earnings Quality Construct and Measures in Empirical Accounting Stud-ies. International Conference on Governance & Strategic Management. Procedia Economics and Finance.

Kawor S. & Kportorgbi H. K. (2014) Effect of Tax Planning on Firms Market Performance: Evidence from Quoted Firms in Ghana. International Journal of Economics and Finance. 6 (3) 162 -168.

Khurana I., & Moser W. J. (2013), "Institutional shareholders' investment horizons and tax avoidance," American Accounting Association 35(1)111-134.

Kim, J. B., Li, B., & Zhang, L. (2011). Corporate tax avoidance and stock price crash risk: firm-level analysis. Journal of Financial Economics, 100(3), 639-662.

Lanis R., Richardson G., & Taylor G., (2015) "Board of director gender and corporate tax aggressiveness: an empir-ical analysis," Journal of Business Ethics. DOI:10.1007/s10551-015-2815-x,1-20.

Lanis, R. & Richardson G., (2012) "Corporate social responsibility and tax aggressiveness: An empirical analysis," Journal of Accounting and Public Policy, 31(1) 86-108.

Lev, B. & Nissim D, (2004), "Taxable income as an indicator of earnings quality. Working paper. New York Uni-versity, NY P 39.

Lev, B. & Nissim D, (2004), "Taxable income, future earnings, and equity values," The Accounting Review

79(4):1039-1074.

Li, Y. (2014). Tax-induced earnings management, auditor conservatism, and tax enforcement Master's thesis, Lingnan University, Hong Kong. Retrieved from http://commons.ln.edu.hk/acct_etd/17

Linda H. Chen, Dan S. Dhaliwal, Mark A. Trombley (2012) Consistency of Book-Tax Differences and the Infor-mation Content of Earnings. The Journal of the American Taxation Association 34(2) 93-116.

Lipe, R. (1990) The relationship between stock returns and accounting earnings alternative information, The Ac-counting Review, 65(1) 49-71.

Lisowsky, P., Lennox C., & Pittman, J. (2013). Tax aggressiveness and accounting fraud. Journal of Accounting Research, 51 (4), 739-778.

Lisowsky, P., Robinson, L., & Schmidt, A. (2013). Do Publicly Disclosed Tax Reserves Tell Us About Privately Disclosed Tax Shelter Activity? Journal of Accounting Research, 51, 583-629.

Lyimo D. (2014) Assessing the Measures of Quality of Earnings: Evidence from India. European Journal of Ac-counting Auditing and Finance Research 2(6) 17-28.

Management: Based on China's Capital Market. Journal of Industrial Engineering and Management. 8(2) 417-434.

Marai1 A. & Pavlović V. (2014) Overview of Earnings Management Measurement Approaches: Development and Evaluation. Economics and Organization 11 (1) 21 – 36.

Marques A. V., Costa P. & Silva P. R. (2016) The Relevance of the Informational Content of Book-Tax Differ-ences for Predicting Future Income: Evidence from Latin American Countries. USP, São Paulo 27(70) 29-42

Mgammal M. H. & Ismail K. N (2015) Corporate Tax Planning Activities: Overview of Concepts, Theories, Re-strictions, Motivations and Approaches. Mediterranean Journal of Social Sciences. 6 (6) 350 – 358

Mills, L., Newberry, K & Trautman,W. B. (2002). "Trends in Book-Tax Income and Balance Sheet Differences," Tax Notes 96: 1109-1124.

Minnick, K., & Noga, T. (2010). Do corporate governance characteristics influence tax management? Journal of Corporate Finance, 16(5), 703-718.

Mohammadreza A., Aliasghar M. & Hamid P. (2013) Empirical Research on the Relationship between Earnings Quality and Tax Policies of Companies. International Journal of Economy, Management and Social Sciences, 2(10) P 854-858.

Myers, J., Myers, L., & Omer, T., (2003). Exploring the Term of the Auditor-Client Relationship and the Quality of Earnings: A Case for Mandatory Auditor Rotation? Accounting Review 78, 779-799.

Nolands Taxflash (2017) Transfer pricing in Nigeria. enquiries@nlands.ng May 2017.

Oyeleke O. ,Olayinka E. & Emeni F. (2016) Female Directors and Tax Aggressiveness of Quoted Banks in Nigeria. 3rd International Conference on African Development Issues, Nigeria.

Perotti P. & Wagenhofer A (2011) Earnings Quality Measures and Excess Returns. Centre for Accounting Research University of Graz Austria

Phillips, J. (2003). Corporate tax planning effectiveness: the role of compensation based incentives. The Accounting Review, 78(3), 847-874.

Prelec, D., (1998). The probability weighting function. Econometrica 60, 497-528.

Price Copers Waters (2015) New changes at the Federal Inland Revenue Service and what taxpayers should expect. Nigeria Tax Alert September 2015. www.pwc.com

Raedy J. S., Seidman J. & Shackelford D. A. (2010) Book-Tax Differences: Which Ones Matter to Equity Inves-tors? Working paper. UNC Tax Center.

Rafay A. & Ajmal M. (2014) Earnings Management Through Deferred Taxes Recognised Under IAS 12: Evidence From Pakistan. The Lahore Journal of Business 3(1)1 – 19.

Reidenbach, R. E., & Robin, D. P. (1991). A Conceptual Model of Corporate Moral Development. Journal of Business Ethics, 10(4), 273-284.

Romanus, R. N. (2007) The impact of earnings quality on investors' and analysts' reactions to restatement an-nouncements. Dissertation in Virginia Polytechnic Institute and State University for PhD in general business with a concentration in accounting.

Salihu A. I, Obid S. N. & Annuar H. A. (2013) Measures of Corporate Tax Avoidance: Empirical Evidence from an Emerging Economy. International Journal of Business and Society, Vol. 14(3), 412 – 427.

Satyawati E.& Palupi D. A. (2017) The Influence of Book Tax Differences on Correlation of Current Earnings, Accruals, and Cash Flows to Future Earnings. Review of Integrative Business and Economics Research, 6(4) 82 – 93.

Seidman J. K. (2008) Investigating the Book-Tax Income Gap: Factors Which Affect the Gap and Details Regarding its Most Significant Component. PhD thesis in Management, Massachusetts Institute of Technology.

Sepe, Nelson, Tan, and Spiceland (2012). Intermediate Accounting IFRS Global Edition (7th ed.). Mc Graw Suc-ceed.

Setterberg, H. (2011) Earnings quality and implied cost of capital: The Swedish case, PhD dissertation Stock Holm University (accessed 20/12/2013).

Shehu, U. H. & Musa, A. F. (2014) Firm Attributes and Earnings Quality of Quoted Oil and Gas.

Stephen A., Sophie M., Jean-Pierre V., & Matthew W. (2014) Business Ethics and Tax Aggressiveness. Autorité des marchés financiers of Quebec.

Stickney, C., & McGee, V. (1982). Effective corporate tax rates: The effect of size, capital intensity, leverage, and other factors. Journal of Accounting and Public Policy, 1, 125-152.

Talisman, J., (1999). Testimony before the House Committee on Ways and Means.

Thomas J. & Zhang F. (2010) Tax expense momentum. Yale University.

Tversky, A. & Kahneman, D., (1992). Advances in prospect theory: cumulative representation of uncertainty. Journal of Risk and Uncertainty 5, 297-323.

Waluyo (2016) The relationship between book-tax differences and earnings growth within Indonesian manufacturing firms. Research Journal of Finance and Accounting. 7(18) 127 – 133.

Warshavsky, M. (2012), Analysing Earnings quality as a Financial Forensic Tool. forensics/ fraud - earnings Quality and the Beneish Model. FVLe issue 39 16 -20.

Wikipedia, (2018). Tax Shelter. www.wikipedia/taxshelter.com

Wilson, R. J. (2009). An examination of corporate tax shelter participants. Accounting Review 84 (3) (05): 969-99.

Yaniv, G., (1999). Tax compliance and advance tax payments: a prospect theory analysis. National Tax.

Appendix 1. Descriptive Statistics

	Descriptive Statistic						
	ModifiedJone-sModel	CashETR	LngtermETR	TaxSavings	BookTaxGap	Temporary-Diff	Permanen-tDiff
Mean	0.052380	0.168147	0.687532	0.134508	1752912.	76592962	-74638687
Median	0.043294	0.259662	0.237874	0.035068	-26789.37	7546.667	-42175.42
Maximum	2.030507	41.08395	504.8176	91.18309	2.19E+08	3.42E+10	4.55E+08
Minimum	-7.289997	-90.88309	-13.30251	-40.78395	-36503027	-4.55E+08	-3.40E+10
Std. Dev.	0.352481	3.514536	16.93605	3.506950	16144385	1.50E+09	1.49E+09
Skewness	-11.37728	-17.51451	29.64928	17.62650	8.467747	21.21948	-21.21704
Kurtosis	218.5567	529.2900	883.1203	533.8275	84.22826	454.4264	454.3489
Jarque-Bera	1744223.	10328480	28888007	10507138	255599.7	7632413.	7629798.
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	4.667485	149.8191	612.5911	119.8468	1.56E+09	6.82E+10	-6.65E+10
Sum Sq. Dev.	110.5763	10993.25	255278.6	10945.84	2.32E+17	2.01E+21	1.98E+21
Observations	891	891	891	891	891	891	891

Appendix 2. Correlation Matrix

	Descriptive Statistic						
	ModifiedJone-sModel	CashETR	LngtermETR	TaxSavings	BookTaxGap	Temporary-Diff	Permanen-tDiff
ModifiedJones	1.000000	0.005995	0.005231	-0.007528	0.062215	0.007367	-0.006834
CashETR	0.005995	1.000000	0.004338	-0.099747	-0.007294	-0.003253	0.003157
LngtermETR	0.005231	0.004338	1.000000	-0.004144	-0.004904	-0.002005	0.001959
TaxSavings	-0.007528	-0.099747	-0.004144	1.000000	0.007256	0.003222	-0.003126
BookTaxGap	0.062215	-0.007294	-0.004904	0.007256	1.000000	0.588490	-0.581638
TemporaryDiff	0.007367	-0.003253	-0.002005	0.003222	0.588490	1.000000	-0.099996
PermanentDiff	-0.006834	0.003157	0.001959	-0.003126	-0.581638	-0.099996	1.000000

Variable	VIF	1/VIF
TaxSavings	1.45	0.997908
CashETR	1.37	0.996784
BookTaxGAP	1.01	0.993931
PermanentD~f	1.01	0.994391
LngtermETR	1.00	0.999908
Mean VIF	1.168	

Appendix 3. Regression result of the modified Jones Model

Dependent Variable: MODIFIEDJONESMODEL
Method: Panel Least Squares
Date: 02/13/18 Time: 11:51
Sample: 2009 2016
Periods included: 8
Cross-sections included: 113
Total panel (unbalanced) observations: 892

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009041	0.019260	0.469416	0.6389
CashETR	-0.029984	0.048950	-0.612552	0.5403
LngtermETR	0.000124	0.000721	0.171555	0.8638
TaxSavings	-0.030798	0.049055	-0.627817	0.5303
BookTaxGAP	3.72E-09	2.79E-09	1.335419	0.1821
TemporaryDIFF	-1.82E-09	2.72E-09	-0.669668	0.5032
PermanentDIFF	-1.81E-09	2.72E-09	-0.665755	0.5057
R-squared	0.206061	Mean dependent var		0.002138
Adjusted R-squared	-0.000678	S.D. dependent var		0.364253
S.E. of regression	0.364376	Akaike info criterion		0.826556
Sum squared resid	117.5013	Schwarz criterion		0.864172
Log likelihood	-361.6438	Hannan-Quinn criter.		0.840932
F-statistic	0.899457	Durbin-Watson stat		1.650335
Prob(F-statistic)	0.494544			

Method: Panel Least Squares
Date: 02/13/18 Time: 11:54
Sample: 2009 2016
Periods included: 8
Cross-sections included: 113
Total panel (unbalanced) observations: 892

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003073	0.020667	0.148692	0.8818
CashETR	-0.024972	0.055088	-0.453308	0.6505
LngtermETR	1.51E-05	0.000735	0.020513	0.9836
TaxSavings	-0.023309	0.055154	-0.422611	0.6727
BookTaxGAP	5.85E-09	2.94E-09	1.987364	0.0472
TemporaryDIFF	-1.09E-09	3.39E-09	-0.321142	0.7482
PermanentDIFF	-1.07E-09	3.39E-09	-0.314157	0.7535
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.511682	Mean dependent var		0.002138
Adjusted R-squared	0.091344	S.D. dependent var		0.364253
S.E. of regression	0.347218	Akaike info criterion		0.845902
Sum squared resid	93.19326	Schwarz criterion		1.485390
Log likelihood	-258.2725	Hannan-Quinn criter.		1.090296
F-statistic	1.759056	Durbin-Watson stat		1.937470
Prob(F-statistic)	0.000007			

Dependent Variable: MODIFIEDJONESMODEL
Method: Panel EGLS (Cross-section random effects)
Date: 02/13/18 Time: 11:59
Sample: 2009 2016
Periods included: 8
Cross-sections included: 113
Total panel (unbalanced) observations: 892
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.008183	0.021691	0.377276	0.7061
CashETR	-0.028245	0.049836	-0.566747	0.5710
LngtermETR	8.04E-05	0.000707	0.113693	0.9095
TaxSavings	-0.028045	0.049924	-0.561758	0.5744
BookTaxGAP	4.56E-09	2.77E-09	1.647564	0.0998
TemporaryDIFF	-2.22E-09	2.76E-09	-0.806390	0.4202
PermanentDIFF	-2.21E-09	2.76E-09	-0.801061	0.4233
	Effects Specification			
			S.D.	Rho
Cross-section random			0.108603	0.0891
Idiosyncratic random			0.347218	0.9109
	Weighted Statistics			
R-squared	0.270402	Mean dependent var		0.001667
Adjusted R-squared	0.000672	S.D. dependent var		0.347753
S.E. of regression	0.347636	Sum squared resid		106.9527
F-statistic	1.099897	Durbin-Watson stat		1.772555
Prob(F-statistic)	0.360458			
	Unweighted Statistics			
R-squared	0.005647	Mean dependent var		0.002138
Sum squared resid	117.5503	Durbin-Watson stat		1.648796

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		8.724442	6	0.0197
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
CashETR	-0.024972	-0.028245	0.000551	0.8891
LngtermETR	0.000015	0.000080	0.000000	0.7444
TaxSavings	-0.023309	-0.028045	0.000550	0.8399
BookTaxGAP	0.000000	0.000000	0.000000	0.1958
TemporaryDIFF	-0.000000	-0.000000	0.000000	0.5669
PermanentDIFF	-0.000000	-0.000000	0.000000	0.5644

Cross-section random effects test equation:
Dependent Variable: MODIFIEDJONESMODEL
Method: Panel Least Squares
Date: 02/13/18 Time: 12:00
Sample: 2009 2016
Periods included: 8
Cross-sections included: 113
Total panel (unbalanced) observations: 892

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003073	0.020667	0.148692	0.8818
CashETR	-0.024972	0.055088	-0.453308	0.6505
LngtermETR	1.51E-05	0.000735	0.020513	0.9836
TaxSavings	-0.023309	0.055154	-0.422611	0.6727
BookTaxGAP	5.85E-09	2.94E-09	1.987364	0.0472
TemporaryDIFF	-1.09E-09	3.39E-09	-0.321142	0.7482
PermanentDIFF	-1.07E-09	3.39E-09	-0.314157	0.7535
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.511682	Mean dependent var		0.002138
Adjusted R-squared	0.091344	S.D. dependent var		0.364253
S.E. of regression	0.347218	Akaike info criterion		0.845902
Sum squared resid	93.19326	Schwarz criterion		1.485390
Log likelihood	-258.2725	Hannan-Quinn criter.		1.090296
F-statistic	1.759056	Durbin-Watson stat		1.937470
Prob(F-statistic)	0.000007			

Dependent Variable: MODIFIEDJONESMODEL
Method: Panel Generalised Method of Moments
Date: 08/19/18 Time: 20:02
Sample (adjusted): 2010 2016
Periods included: 7
Cross-sections included: 115
Total panel (unbalanced) observations: 772
2SLS instrument weighting matrix
Instrument specification: C CashETR(-1) LngTermETR(-1) TaxSavings(
-1) BookTaxGap(-1) TemporaryDIFF(-1) PermanentDIFF(-1)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045500	0.067998	0.669144	0.5036
CashETR	-0.102421	0.517612	-0.197872	0.8432
LngTermETRr	-0.000161	0.007120	-0.022609	0.9820
TaxSavings	-0.154578	0.295529	-0.523054	0.6011
BookTaxGap	1.19E-09	2.00E-08	1.059488	0.0952
TemporaryDiff	-1.17E-09	2.79E-08	-0.041859	0.9666
PermanentDiff	-1.17E-09	2.80E-08	-0.041878	0.9666
R-squared	0.282875	Mean dependent var		0.007387
Adjusted R-squared	0.292936	S.D. dependent var		0.337077
S.E. of regression	0.383282	Sum squared resid		112.3821
Durbin-Watson stat	1.610499	J-statistic		9.77E-11
Instrument rank	7			