RELATIONSHIP BETWEEN DEFERRED TAX CATEGORY AND STOCK PRICES IN PHARMACY

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Abstract

The paper deals with relationship between stock prices and deferred tax category. Joos, Pratt and Young provided evidence that book-tax differences are correlated with earning management. In this paper is confirmed negative relationship between stock prices and deferred tax. The relationship is assessed on sample of companies making business in pharmacy (CZNACE-C-21). The relationship between deferred tax category and stock prices is assessed on a sample of companies in the time series from 2005 to 2015. Sample consists of companies listed on Frankfurt stock exchange and reporting in accordance with international accounting standards IAS/IFRS. The stock prices dataset is based on Morningstar database. The results are compared with the results of author 's previous study concerning the deferred tax materiality.

Keywords: deferred tax category, stock prices, pharmacy

INTRODUCTION

Deferred tax is an accounting category. Main purpose of deferred tax category is to determine costs to the correct period in which arose. The deferred tax category is created due to differences between accounting and tax rules. There are three areas which are related with deferred tax category, those are accounting for income taxes, earnings management and capital market anomalies.

Joos, Pratt and Young (2002) confirmed that book-tax differences can reflect earning management as large book-tax differences which are correlated with a lower earnings return relationship. Phillips, Pincus and Rego (2003) provided evidence that in years which companies show small increase in earnings per share, their deferred expenses are larger than for years there was small decrease in earnings per share. Based on these studies I would like to confirm basic assumption that due to deferred tax category can leadership of company intentionally influence profit and loss and through this category

affects the stock prices. Then the stocks are more desirable for external investors. Abnormally high deferred tax is one of the most important sings that financial statements are not in accordance with law principles. Therefore I expect negative relationship. Therefore if the deferred tax significantly increase stock prices would decrease.

Theoretical background

Deferred tax category is caused due to differences between financial reporting system and tax system in particular country. There are two financial reporting systems Anglo-Saxon and continental. Anglo-Saxon financial reporting system is focused on fair view of the situation in a particular company. This reporting system quite is independent on tax legislation, therefore there arise higher book-tax differences (hereinafter BTD) than in continental reporting system which is primarily bounded with tax system.

There are two types of BTDs – permanent and temporary. Deferred tax category arises due to

temporary BTD. Those differences arise due to the fact that the tax rules and rules for financial reporting are in most countries different. Second type, permanent differences effect (in the form of reduction or increase of taxable income comparing with reported income) is definitive.

Discussion on the deferred tax category as a source of information for external users of financial statements has been extensive in the during the last years especially in the US environment (Desai, 2003; Manzon and Plesko, 2002; Plesko, 2004; Phillips *et al.*, 2003; Landry and Chlala, 2005; Hanlon *et al.*, 2014, Chi *et al.*, 2014; Noga and Schnader, 2013; Laux, 2013, Blaylock *et al.*, 2012; Donohoe and McGill, 2011, Colley *et al.*, 2012; Crabtree and Maher, 2009; Weber, 2009; Shackelford *et al.*, 2009; Jackson, 2015). The majority of them were focused on data sample of companies listed on US exchange stocks. They investigated relation between book and tax reporting and firms' incentives to engage in earnings management activities, and an increase in the risk of the non-achievement of planned goals. It is obvious that the conclusions were very similar. For example Landry and Chlala (2005) synthetize available sources of differences between book and taxable income. They provided evidence that the book-tax difference is an indicator of certain trends and discrepancies, and of a risk of failure to achieve sufficient income in the future. Also Hanlon (2014) found out relationship between tax enforcement and financial reporting quality. She concluded that higher tax enforcement by the tax authority has a positive relation with the quality of financial statements.

First who investigated the relationship between the ratio to tax-to-book income, for the purpose to predict earnings growth and stock returns and to explain the earnings price ratio. They investigated in period before and after the implementation of Statement of Financial Accounting Standards (SFAS) no. 109 in 1993. They dealt with both temporary and permanent BTDs as well as tax accruals, such as changes in the tax valuation allowance. They concluded that the tax fundamental is strongly related to contemporaneous earnings-price ratios and weakly related to stock returns. This conclusion can be used for investor's perception of the involvement of the tax information for future earnings during the time.

Shackelford, Slemrod and Sallee, 2009 investigated the relation between accounting earnings and cash flow and the impact of BTDs on these indicators. They concluded that the attractiveness of some investment decisions is enhanced because they provide managers with discretion over the timing of taxable income and/or book income.

Poterba (2010) investigate how deferred tax category can affect behavior of the company before and after a pre-announced change in statutory corporate tax rate. His data sample consists of US companies in time period between 1993 and 2004. He provided evidence that the heterogeneous deferred tax positions of large US companies create substantial variation in short run effect of tax rate changes on reported earnings. His conclusion is important for understanding the political economy of corporate tax reform.

Leach and Newsome (2007) and Rosner (2003) provided evidence that there is greater probability of bankruptcy of companies, whose manage their earnings by BTDs. Those changes in BTDs used to be caused by leadership activities.

There are only a few studies carried out in European environment like Gordon and Joos (2004), Bohušová and Svoboda (2005), Chludek (2011), and Vučković-Milutinović and Lukić (2013).

The study of Vučovič-Mutinovič and Lukič (2013) investigated the materiality of deferred tax assets and deferred tax liabilities. Their dataset covers the period of 2009–2010 and consists of 20 largest non-financial companies and 20 banks in Serbia. There is also study Bohušová and Svoboda (2005) focused on dataset of companies making business in Czech Republic and preparing the financial statements in accordance with Czech legislation. Their conclusion shown the materiality of the deferred tax – the median of deferred tax/total income tax ratio is 15.21% resp. 7.4% in the researched companies. As a most complex research can be considered the study of Chludek (2004).

Holland and Jackson (2003) researched deferred tax provision of companies during a period in which firms' incentive to manage earnings may have been be particularly strong. Their data sample consists of 58 companies and covers the time period form up 1991 to 1992. Their findings supported general profit-smoothing hypothesis and finding in relation to advance corporation tax suggest that firms take an overall view in determining the required level of provision in order to manage earnings, rather than concentrating upon particular line items.

I: *Dependency rate in accordance with correlation coefficient*

Value of correlation coefficient	Dependency rate
0,00–0,19	very weak dependency
0,20–0,39	weak dependency
0,40–0,59	medium dependency
0,60–0,79	strong dependency
0,80–1,00	very strong dependency

Source: Evans, 1996

MATERIALS AND METHODS

The paper deals with relationship between deferred tax category and stock prices on data sample of companies reporting in accordance with international accounting standards IAS/IFRS. The paper is built on conclusions of author's previous studies (Habanec, 2016; Habanec, Bohušová, 2017; Habanec, 2017).

The paper deals with deferred tax category reporting in accordance with international accounting standards IAS/IFRS on data sample of companies listed on Frankfurt stock exchange. The dataset consists of financial reports of companies making business in pharmacy (NACE 21). Pharmacy industry was chosen due to lot of obligations arising in applying accounting standards IAS/IFRS to reporting deferred tax category. Those obligations are restoring items of property, plant and equipment, creation of provisions, revaluation on fair value, etc. The data sample covers period starting in 2005 up to 2015. Starting year 2005 was chosen as a first year of obligatory application of IFRS for publicly traded companies within the EU.

The dataset of stock prices was used from Morningstar database. The number of 34 companies was identified in pharmacy industry. To the dataset were selected only companies with significant deferred tax category based on paper Habanec, 2017. Finally data sample consists of 23 companies and covers period 2005 up to 2015. Total observations are 253 firm-years.

For identification of relationship between deferred tax category and stock prices was used correlation and regression analysis.

For investigation whether there is relationship between deferred tax category and stock prices was used correlation analysis. Correlation analysis is based on correlation coefficient which determines direction of correlation as well as tightness of dependence. Evans 1996 defined the value of correlation coefficient as following:

Hypothesis and model development

Previous studies showed that deferred category was related to stock prices (Jackson, 2015; Philips *et al.*, 2003). Deferred tax assets and liabilities which arise from temporary differences between accounting income and taxable income will reflect future taxable benefits and sacrifices. The deferred taxes are expected to be value relevant information, deferred tax assets and liabilities are expected to be significantly related to stock prices. Therefore there were stated following hypothesis:

H_1: Deferred tax assets and liabilities are significantly related to stock prices and the direction of the relationship is negative.

For confirmation of the hypothesis stated above is formulated following model:

$$P_{it} = \alpha_0 + \alpha_1 DTC_{it} + \varepsilon_{it},$$

where:
P_{it} = stock's price per share of firm i year t;
DTC_{it} = deferred tax category of firm i year t;
ε_{it} = error.

By the sign before constant is identified the direction of relationship.

Econometric verification is based on the application of econometric tests to the estimated model. Econometric tests are following:

1. LM test for specification for squares and logarithms – is used for verifying correct specification of model as well as t-test and F-test.
2. RESET test of correct specification of model – is also used for verifying correct specification of model. If the test is not fulfilled it is necessary to check if all variables are included in model or if functional form is correctly chosen.
3. White heteroskedasticity test – verifies whether there is heteroskedasticity in the model. If not the assumption of constant variance of error member is fulfilled.
4. Test of normality error member – verifying if there is normal distribution of error member. (Verbeek, 2012)

RESULTS

For investigation of relationship between deferred tax category and stock prices was used correlation analysis.

From Tab. II is apparent that there is a relationship between deferred tax category and stock prices for pharmacy. It was calculated average of correlation coefficients for the whole industry and the result is a medium relationship. For finding out which kind of relationship was used regression analysis.

From Tab. III is apparent that for all companies making business in pharmacy is positive relationship between deferred tax category and stock prices. These conclusions correspond with author's assumption stated in methodology part and arises from theoretical background part. There was stated assumption that due to deferred tax category leadership of company can intentionally influence profit and loss statement. Due to this fact stocks of the company becoming more desirable on stock exchange. Finally we can say that if the deferred tax category will be increased the stock prices will rise. Fulfilling of classic assumptions of regression model is stated in following tables:

Several companies (Eckert, Evotec, Statorius, Martenus and Mediclin) not fulfilled the specification tests, therefore there has to be added constant or logarithm of the deferred tax category for smoothing the course of the linear function.

Tab. V shows results of residuum tests. For several companies (AAP Implante, Stada, Quiagen and Gerresheimer) there was heteroskedasticity issue, therefore it was necessary to add squares of deferred tax category.

II: *Dependency rate in pharmacy*

Company	Correlation coefficient	p-value	Dependency rate
AAP IMPLANTE	0,18	0,00005	Very weak
BIOTEST	0,64	0,0342	Strong
CARL ZIESS	0,52	<0,0001	Medium
Draegerwerk	0,63	<0,0001	Strong
Eckert and Ziegler	0,79	0,038	Strong
EPIGENOMICS	0,06	0,0108	Very weak
EVOTEC	0,31	0,0152	Weak
FRESEN	0,38	0,0062	Weak
GERATHERM	0,58	0,0057	Medium
STADA	0,43	<0,0001	Medium
SARTORIUS	0,12	0,0518	Very weak
STRATEC Biomedical	0,76	0,0069	Strong
Qiagen	0,02	0,0007	Very weak
OASMIA	0,96	<0,0001	Very strong
MediClin	0,35	0,0022	Weak
Maternus-Kliniken	0,62	0,0406	Strong
Gerresheimer	0,42	0,0004	Medium
SYGNIS	0,14	0,0468	Very weak
VITA	0,01	0,0169	Very weak
United Medical Systems	0,58	0,0002	Medium
Curasan	0,33	<0,0001	Weak
Merck	0,63	0,0391	Strong
MorphoSys	0,49	0,0026	Medium
Average	**0,43**		**Medium**

Source: Own research

III: *Test statistics*

Company	p-value	R² adj	Direction of relationship
AAP IMPLANTE	0,000090	0,71	-
BIOTEST	0,0131	0,48	-
CARL ZEISS	<0,0001	0,91	-
Draegerwerk	0,000001	0,93	-
Eckert and Ziegler	0,003	0,60	-
EPIGENOMICS	0,0108	0,49	-
EVOTEC	0,000001	0,95	-
FRESEN	0,0062	0,54	-
GERATHERM	0,005691	0,55	-
STADA	0,00001	0,98	-
SARTORIUS	0,000937	0,68	-
STRATEC Biomedical	0,0069	0,53	-
Qiagen	0,0044	0,57	-
OASMIA	0,00011	0,87	-
MediClin	0,00001	0,97	-
Maternus-Kliniken	0,006841	0,53	-
Gerresheimer	0,001027	0,68	-
SYGNIS	0,0468	0,34	-
VITA	0,0169	0,45	-
United Medical Systems	0,00001	0,96	-
Curasan	0,00001	0,97	-
Merck	0,0028	0,60	-
MorphoSys	0,0026	0,61	-

Source: Own research

IV: *Tests of correct specification of the model*

Company	Ramsey RESET test (second and third powers)	Ramsey RESET test (second powers)	Ramsey RESET test (third powers)	LM test (logarithms)	LM test (second powers)
AAP IMPLANTE	0,00819	0,14	0,287	0,021	0,11
BIOTEST	0,0755	0,0804	0,134	0,0044	0,0687
CARL ZEISS	0,0677	0,0721	0,136	0,0058	0,0624
Draegerwerk	0,201	0,579	0,753	0,2688	0,5322
Eckert and Ziegler	0,075	0,222	0,273	0,10635	0,1594
EPIGENOMICS	0,368	0,476	0,62	-	0,425
EVOTEC	0,23	0,176	0,157	0,164	0,144
FRESEN	0,193	0,209	0,369	0,0422	0,173
GERATHERM	0,222	0,109	0,136	-	0,09111
STADA	0,73	0,459	0,48	0,389	0,8492
SARTORIUS	0,48	0,265	0,248	0,264	0,2219
STRATEC Biomedical	0,456	0,212	0,223	0,2707	0,1512
Qiagen	0,0732	0,0915	0,182	0,0013	0,07723
OASMIA	0,696	0,813	0,9	-	0,7889
MediClin	0,211	0,604	0,557	0,6777	0,1942
Maternus-Kliniken	0,807	0,68	0,644	0,83	0,6199
Gerresheimer	0,193	0,28	0,3	0,152	0,2355
SYGNIS	0,654	0,834	0,761	-	0,8122
VITA	0,0802	0,0528	0,0685	-	0,048
United Medical Systems	0,832	0,551	0,53	0,6283	0,764
Curasan	0,108	0,107	0,11	-	0,0732
Merck	0,0507	0,262	0,369	-	0,2192
MorphoSys	0,13	0,289	0,349	0,0871	0,2432

Source: Own research

V: *Tests of residuum*

Company	White test	Koenker test	Normality of residuum
AAP IMPLANTE	0,1073	0,2774	0,104
BIOTEST	0,2144	0,4537	0,89574
CARL ZEISS	0,278	0,4408	0,52092
Draegerwerk	0,0787	0,9815	0,07315
Eckert and Ziegler	0,98804	0,8768	0,42855
EPIGENOMICS	0,536	0,1984	0,2027
EVOTEC	0,0524	0,9642	0,2757
FRESEN	0,1618	0,3204	0,4244
GERATHERM	0,5519	0,2310	0,41817
STADA	0,0795	0,2009	0,4462
SARTORIUS	0,0746	0,9484	0,1645
STRATEC Biomedical	0,4246	0,201	0,9999
Qiagen	0,25911	0,1667	0,5589
OASMIA	0,9059	0,2052	0,5642
MediClin	0,1038	0,0838	0,7327
Maternus-Kliniken	0,2735	0,3399	0,8521
Gerresheimer	0,1116	0,7857	0,0682
SYGNIS	0,6332	0,2951	0,645
VITA	0,08245	0,8444	0,4693
United Medical Systems	0,1304	0,1382	0,243
Curasan	0,0715	0,2647	0,9744
Merck	0,2465	0,243	0,9017

CONCLUSIONS

The main object of the paper was to confirm if there is a relationship between deferred tax category and stock prices and detect the relationship direction. The identification if there is any relationship between deferred tax category and stock prices was based on correlation analysis. For finding out the direction of relationship regression analysis was used. Finally for the whole industry was identified medium rate of the relationship with negative direction. This means that if the deferred tax category will increase the stock prices decrease. This conclusion correspond with a predetermined hypothesis due to deferred tax category leadership of company can intentionally influence profit and loss. Deferred tax category is used as means how to asses if the company prepare their financial statements in accordance with law and accountant principles. Conclusions of this paper confirm that due to book-tax differences can be influenced stock prices. Therefore the deferred tax can be used as a means how to asses if increase of stock prices is caused by proper management of company or only by manipulation with financial statements. Finally we can say that amount of deferred tax can be used as indicator for external users of financial statements.

Conclusion of the paper correspond with conclusions of Lev and Nissim (2004) and Hanlon (2005) who investigated if tax-base can provide information about growth in earnings and the persistence of earnings. They provide evidence that the deferred income tax provides information to external users which supporting the conclusion of this paper. Poterba (2011) investigate whether the category of deferred income tax may affects behavior and incentives of the company. This conclusion supports the conclusion of this paper. Due to deferred tax category the leadership of company can affect behavior of company so that the stock prices become more desirable for external users. Blaylock *et al.*, 2012, Philips *et al.* (2003) assessed if the usefulness of deferred tax expense in detecting earnings management. They investigated usefulness of deferred tax expenses for total accruals and abnormal accruals. Their conclusion corresponds with conclusion of this paper as a means how to affect deferred tax category and by extension stock prices of the company. Shackelford, Slemrod and Sallee, 2009 concluded that the attractiveness of some investment decisions is enhanced because they provide managers with discretion over the timing of taxable income and/or book income. Those conclusions also correspond with conclusion of this paper.

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