IFRS VERSUS CZ GAAP: ANALYSIS OF CONSTRUCTION CONTRACTS ACCOUNTING AND IMPACT ON FINANCIAL INDICATORS

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Abstract

The entrance of the Czech Republic to the European Union brought the obligation to implement International Financial Reporting Standards (IFRS) to the Accounting Act. IFRS solves some accounting problems differently than the Czech General Accepted Accounting Principles (CZ GAAP) which can result in a different financial indicators value. Those indicators are then used by investors to assess the financial performance of companies and the application of IFRS instead of CZ GAAP can lead to distinct presentation of enterprise performance. The paper identifies differences in the financial statements after CZ GAAP and IFRS and assesses the impact on selected creditworthy and bankruptcy models, especially the impact of accounting for construction contracts after IAS 11. The research focuses on three models – Altman's Z-Score, IN05 and Creditworthy index. The paired t-test is used to analyse the data collected and to identify if the distinctions in the financial indicators after diverse accounting systems are significant.

Key words: construction contracts, IFRS, czech accounting legislation, financial reporting, paired t-test

JEL Code: F63, M14, M41

Introduction

The international trade is developed and more and more companies sells the goods and services abroad. The harmonisation of accounting is one of the discussed issues of modern world. International Financial Reporting Standards (IFRS) focus on harmonisation question that can help companies to better and easier orient in financial statements of their competitors, suppliers or customers in foreign countries. There is no discussion that harmonisation of accounting systems has its pros and cons and that is why the most of the researchers focuses on benefits and disadvantages of IFRS adoption. But what does it says about company`s financial performance? (De Franco, Kothari, & Verdi, 2011)

Company`s financial performance is measured from the company`s financial statements that present different values using IFRS or another accounting system such as CZ GAAP. The results show the performance of the company as a whole or the performance of department and also Key Performance Indicators (KPIs) of employees and management can be raised from the financial statements. This shows their importance for everyone – employees, management, investors and also banks can decide whether to provide a loan to the company or not. (Chan, 2003)

It can be measured using different methods and indicators. (Pavláková Dočekalová, Kocmanová, & Koleňák, 2015) found out that the most important measures for management are Return on Assets (ROA) and cash flow. Another research (Epstein & Roy, 2001) shows that focusing on long-term performance there is a need to focus also on non-financial indicators such as social responsibility or environmental management. Those issues are covered in Economic Value Added (EVA) measure. There are also other ways of company`s financial performance assessment such as bankruptcy and creditworthy models. They assess the performance of the company as a whole mostly in one number and they are easy to interpret. Those models are created after research of a wide sample of companies and that is why they are suitable for benchmarking. There is only a few researchers who focus on influence of IFRS adoption on creditworthy and bankruptcy model values. One of them is (Kubíčková & Jindřichovská, 2014) who used Altman Z-score to find out if there are significant changes in Z-Score using IFRS and CZ GAAP. Their research showed that IFRS shows on average 19 per cent lower values after IFRS than using CZ GAAP.

In our research we focus on one of differences between IFRS and CZ GAAP – the accounting for construction contracts. We try to show the influence of different way of accounting to financial performance measured with creditworthy and bankruptcy models. We set the research question as follows: Does the company`s performance using creditworthy and bankruptcy models shows better results using IFRS than using CZ GAAP?

1 Construction contracts

We focus on one company that is mainly influenced by construction contracts accounting. Construction contracts are defined in IAS 11 as contracts specifically negotiated for a construction of an asset or a group of interrelated assets and shall be applied in accounting in the financial statements of contractor. (IFRS Foundation) Compared to CZ GAAP (Ministry

of Finance, 2002) there is a different way of accounting. The most significant difference is caused by the fact that IAS 11 requests to book the profit based on the percentage of completion while CZ GAAP recognizes the profit after invoicing. The results of (Havlová, IFRS versus CZ GAAP: Influence of construction contracts on financial indicators, 2015) showed that the profit is more stable under IFRS as it is not influenced by the invoicing conditions.

2 Financial performance

We concentrate on creditworthy and bankruptcy models for assessing financial performance. Previous researches showed that Z-Score calculated after Altman can lead to different values using IFRS and CZ GAAP. (Kubíčková & Jindřichovská, 2014) It could be expected that the similar results would be found in other bankruptcy models too.

The late studies showed that the bankruptcy models developed during 20th century are still valid and can be used in modern environment, especially IN99, IN05 and Altman Z-score. (Machek, 2014)

3 Methodology

3.1 Financial indicators

We decided to use 3 models in total: 2 bankruptcy models, 1 creditworthy model.

First model is Altman's Z-score. This is bankruptcy model that uses discriminant analysis. As we focus on company which is not publicly traded we use Altman Z-Score for private companies published in 1984. When the calculation shows that Z is under 1.23 ("Distress Zone"), the company is in danger of bankruptcy. The result between 1.23 and 2.9 ("Grey Zone") represents the company that is likely will not bankrupt and Z above 2.9 ("Safe Zone") says that the company has a good financial health and it is highly probable that it will continue in the market. (Lizarzaburu, Berggrun, & Ostos, 2013)

$$Z = 0.717 \times X_1 + 0.847 \times X_2 + 3.107 \times X_3 + 0.420 \times X_4 + 0.998 \times X_5 \quad (1)$$

Where: X_1 = Current assets / Total assets

X_2 = Retained earnings / Total assets

X_3 = Earnings before interest and taxes / Total assets

X_4 = Book value of equity / Total liabilities

X_5 = Sales / Total assets

Second bankruptcy model is IN05 that was created by Ivan and Inka Neumaier in 2005. This model is updated version of previous model IN01 created by this couple. It uses the discriminant analysis, so as Altman's model. The value below 0.9 represents "Distress Zone" where company is threatened by potential bankruptcy, results between 0.9 and 1.6 represent "Grey Zone" and IN05 above 1.6 shows that the company is in "Health Zone". The interpretation of each zone is the same as in Altman's model. (Machek, 2014) (Kuběnka & Bolečková, 2015)

$$IN05 = 0.13 \times X_1 + 0.04 \times X_2 + 3.97 \times X_3 + 0.21 \times X_4 + 0.09 \times X_5 \qquad (2)$$

Where: X_1 = Total assets / Liabilities

X_2 = Earnings before interest and taxes / Interest paid

X_3 = Earnings before interest and taxes / Total assets

X_4 = Sales / Total assets

X_5 = Current assets / Current liabilities

The last used model is Creditworthy index. This model also represents discriminant analysis that uses six measurements, gives them specific wage and then summarize them. The most important is ROA with wage of 10. For assessing the performance, there are also three main zones: "Safety Zone" with CI above 2, "Grey Zone" with values between 0 and 2 and "Distress Zone" is represented by CI below 0. The model differentiates the zones closer according to the financial situation, there is seven areas with different interpretation but for our purposes we will use this three basic zones. (Vochozka, 2011) (Havlová, Bakalářská práce: Finanční analýza podniku Vodafone Czech Republic a. s., 2012)

$$CI = 1.5 \times X_1 + 0.08 \times X_2 + 10 \times X_3 + 5 \times X_4 + 0.3 \times X_5 + 0.1 \times X_6 \qquad (3)$$

Where: X_1 = (Profit after tax + depreciation) / Total liabilities

X_2 = Total assets / Total liabilities

X_3 = Earnings before interest and taxes / Total assets

X_4 = Earnings before interest and taxes / Sales

X_5 = Inventories / Sales

X_6 = Sales / Total assets

3.2 Paired t-test

In this research we focus on finding the financial indicators values after two accounting systems – CZ GAAP and IFRS. There is a relationship between those two values that is why we decided to use paired t-test for testing the hypothesis.

First of all, we calculate the creditworthy and bankruptcy models for years 2010 – 2014 ($n = 5$). They will be calculated both after CZ GAAP ($X_1,...,X_5$) and after IFRS ($Y_1,...,Y_5$). We will calculate t-statistic using MS Excel with Data Analysis tool. The zero hypothesis will be rejected if the probability P is below 5%.

4 Findings

4.1 Hypothesis

In our research we try to prove that "The creditworthy and bankruptcy models according to IFRS reach to significantly different values than after CZ GAAP". Therefore, we set the zero hypothesis as "There is no significant difference in values of the Altman's Z-Score, IN05 and Creditworthy index values calculated after CZ GAAP and IFRS". Alternative hypothesis is set in opposite way: „The creditworthy and bankruptcy models according to IFRS reach to significantly different values". As we test three different creditworthy and bankruptcy models we test the zero hypothesis for each of the models separately.

4.2 Altman Z-Score

The first bankruptcy model that we focus on is Altman's Z-Score. We calculated Z-Score values for all five years using financial statements after CZ GAAP and IFRS. The calculated values are in the following table.

Tab. 1: Altman Z-Score calculations

wage	0.717	0.847	3.107	0.42	0.998	
CZ GAAP	**X1**	**X2**	**X3**	**X4**	**X5**	**Z-Score**

2010	0.765	0.200	0.049	0.431	1.110	2.158
2011	0.763	0.228	0.045	0.505	1.121	2.210
2012	0.766	0.256	0.024	0.518	1.085	2.140
2013	0.788	0.235	0.023	0.454	1.028	2.054
2014	0.729	0.256	0.029	0.544	1.078	2.134
IFRS	**X1**	**X2**	**X3**	**X4**	**X5**	**Z-Score**
2010	0.762	0.210	0.039	0.428	1.046	2.068
2011	0.810	0.238	0.040	0.513	1.107	2.228
2012	0.808	0.281	0.018	0.561	1.156	2.263
2013	0.826	0.266	0.018	0.506	1.102	2.184
2014	0.765	0.292	0.013	0.592	1.034	2.118

Source: Author

Based on the values we found out that there are differences in values between CZ GAAP and IFRS. In years 2011, 2012 and 2013, IFRS shows better financial health of the company although the values are still in "Grey Zone". In 2010 and 2014, the better financial performance was identified after CZ GAAP. We tested using paired t-test calculated in MS Excel whether the differences between the values are significant.

Fig. 1: Altman Z-Score - Paired t-test

	CZ GAAP	*IFRS*
Mean	2,139118761	2,172182681
Variance	0,003154783	0,006340096
Observations	5	5
Pearson Correlation	0,06860645	
Hypothesized Mean Difference	0	
df	4	
t Stat	-0,784518255	
P(T<=t) one-tail	0,238296249	
t Critical one-tail	2,131846786	
P(T<=t) two-tail	0,476592498	
t Critical two-tail	2,776445105	

Source: Author

Paired t-test result shows that there is probability of 47.66% that there is no difference in Z-Score value. This is above the critical 5% (see section 3.2), therefore we cannot reject zero hypothesis. The calculation shows that there is no significant difference in Z-Score values and we can state that the different treatment of construction contract has no impact on this bankruptcy model.

4.3 IN05

Second bankruptcy model that was tested in our research is IN05.

Tab. 2: IN05 calculations

wage	0.13	0.04	3.97	0.21	0.09	
CZ GAAP	**X1**	**X2**	**X3**	**X4**	**X5**	**IN05**
2010	1.470	9.000	0.049	1.110	1.585	1.120
2011	1.567	9.000	0.045	1.121	1.757	1.134
2012	1.583	9.000	0.024	1.085	1.927	1.062
2013	1.509	9.000	0.023	1.028	1.748	1.022
2014	1.629	9.000	0.029	1.078	1.899	1.085
IFRS	**X1**	**X2**	**X3**	**X4**	**X5**	**IN05**
2010	1.461	9.000	0.039	1.046	1.426	1.051
2011	1.563	9.000	0.040	1.107	1.507	1.090
2012	1.616	9.000	0.018	1.156	1.730	1.041
2013	1.557	9.000	0.018	1.102	1.632	1.011
2014	1.668	9.000	0.013	1.034	1.700	1.000

Source: Author

Based on the values we found out that there are differences in values between CZ GAAP and IFRS. IN05 after IFRS does not reach to as good results as in case on CZ GAAP. In all years, the values belong to "Grey Zone" although IN05 after IFRS in 2014 is close to "Distress Zone". Those calculations showed that IN05 after IFRS can lead to worse opinion about company's performance.

Fig. 2: IN05 - Paired t-test

	CZ GAAP	*IFRS*
Mean	1,084576507	1,038605649
Variance	0,002034425	0,00127935
Observations	5	5
Pearson Correlation	0,72696834	
Hypothesized Mean Difference	0	
df	4	
t Stat	3,303689637	
P(T<=t) one-tail	0,014915064	
t Critical one-tail	2,131846786	
P(T<=t) two-tail	0,029830127	
t Critical two-tail	2,776445105	

Source: Author

We provided paired t-test calculation in order to identify the significance of the difference between IN05 values according to CZ GAAP and IFRS. There is 2.98% probability that there are no differences. As this is below critical 5% (see section 3.2) we can reject zero hypothesis and state that diverse way of accounting for construction contracts causes the significant distinctions in IN05 values.

4.4 Creditworthy index

The last tested model is Creditworthy index. This is the only creditworthy model that we calculated in this paper.

Tab. 3: Creditworthy index calculation

wage	1.5	0.08	10	5	0.3	0.1	
CZ GAAP	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**	**CI**
2010	0.065	1.470	0.049	0.044	0.005	1.110	1.032
2011	0.080	1.567	0.045	0.040	0.009	1.121	1.005
2012	0.060	1.583	0.024	0.022	0.016	1.085	0.680
2013	0.030	1.509	0.023	0.023	0.062	1.028	0.634
2014	0.048	1.629	0.029	0.027	0.024	1.078	0.744
IFRS	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**	**CI**
2010	0.051	1.461	0.039	0.037	0.044	1.046	0.881
2011	0.074	1.563	0.040	0.036	0.046	1.107	0.943
2012	0.053	1.616	0.018	0.016	0.040	1.156	0.599
2013	0.023	1.557	0.018	0.016	0.062	1.102	0.545
2014	0.025	1.668	0.013	0.013	0.037	1.034	0.482

Source: Author

The values of Creditworthy index are lower using IFRS than using CZ GAAP. Looking on the interpretation the result belongs to "Grey Zone" but the company should be careful about financial health as the values are rather below 1 and are decreasing in time.

Fig. 3: Creditworthy index - Paired t-test

	CZ GAAP	*IFRS*
Mean	0,819021436	0,689964735
Variance	0,034715474	0,043167725
Observations	5	5
Pearson Correlation	0,920500608	
Hypothesized Mean Difference	0	
df	4	
t Stat	3,548113642	
P(T<=t) one-tail	0,011919467	
t Critical one-tail	2,131846786	
P(T<=t) two-tail	0,023838934	
t Critical two-tail	2,776445105	

Source: Author

Paired t-test showed that P value is 2.38% which is below 5%. Therefore, we can reject zero hypothesis and say that there are significant differences in Creditworthy index values using IFRS instead of CZ GAAP.

Conclusion

We obtained financial statements using CZ GAAP and IFRS of a company that is operating in the field of construction. We discussed the IFRS adjustments with company's representative and we also studied the financial statements in detailed. We identified that the most significant influence on differences between CZ GAAP and IFRS statements has accounting for construction contracts.

In our research we focused on two bankruptcy and one creditworthy model: Altman's Z-Score, IN05 and Creditworthy index. The results of paired t-test show that Altman's Z-Score does not significantly differ after IFRS and CZ GAAP although the calculation shows that CZ GAAP reaches to slightly better values. On the other hand, there are significant differences in values using IFRS and CZ GAAP in models IN05 and Creditworthy index. In both cases CZ GAAP showed more positive values and better financial health than IFRS.

We can conclude that IFRS has no significant impact on Altman's Z-Score but IN05 and Creditworthy index are significantly influenced by the accounting system and the way of construction contract accounting can lead to worse financial performance than in case of using CZ GAAP.

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References

De Franco, G., Kothari, S. P., & Verdi, R. S. (září 2011). The benefits of financial statement comparability. The Journal of Accounting Research, 49(4), S. 895-931. doi:10.1111/j.1475-679X.2011.00415.x

Epstein, M. J., & Roy, M.-J. (2001). Sustainability in action: Identifying and measuring the key performance drivers. *Long range planning*, *34*(5), S. 585-604. Von http://naulibrary.org/dglibrary/admin/book_directory/Bus_Admin/1673.pdf abgerufen

Havlová, K. (2012). Bakalářská práce: Finanční analýza podniku Vodafone Czech Republic a. s. Von http://isis.vse.cz/zp/portal_zp.pl?prehled=vyhledavani;podrobnosti_zp=32726;zp=32726;download_prace=1 abgerufen

Havlová, K. (2015). IFRS versus CZ GAAP: Influence of construction contracts on financial indicators. *International Journal of Entrepreneurial Knowledge, 2*(3), 76-86. Von http://ijek.org/files/IJEK_2-2015v3/IJEK-2-2015,v.3_havlova,k..pdf abgerufen

Chan, J. L. (January 2003). Government accounting: An assessment of theory, purposes and standards. *Public Money and Management, 23*(1), 13-20. doi:10.1111/1467-9302.00336

IFRS Foundation. (kein Datum). IAS 11 Construction contracts.

Kuběnka, M., & Bolečková, A. (2015). Economic Value Added Prediction in Selected Industrial Branches: Case of Czech Republic. *Economics, Law and Political Science,* 143-147. Von http://www.wseas.us/e-library/conferences/2015/Rome/EPLS/EPLS-18.pdf abgerufen

Kubíčková, D., & Jindřichovská, I. (August 2014). Impact of IFRS Reporting on Prediction of Development of Financial Conditions of Czech Firms. *International Journal of Business and Social Science, 5*(9), 215-225. Von http://ijbssnet.com/journals/Vol_5_No_9_1_August_2014/20.pdf abgerufen

Lizarzaburu, E. R., Berggrun, L., & Ostos, J. (2013). Z–Altman Review. The Case of Beverage Company in Latam. *6th Annual EuroMed Conference of the EuroMed-Academy-of-Business* (S. 1411-1433). Cascais: EuroMed Press. Von http://emrbi.org/wp-content/uploads/2014/09/euromed-6-2013.pdf abgerufen

Machek, O. (June 2014). Long-term predictive ability of bankruptcy models in the Czech Republic: evidence from 2007-2012. *Central European Business Review, 3*(2), 14-17. Von https://www.researchgate.net/profile/Ondej_Machek/publication/263848377_Long-term_Predictive_Ability_of_Bankruptcy_Models_in_the_Czech_Republic_Evidence_from_2007-2012/links/00b4953c0d3e28116f000000.pdf abgerufen

Ministry of Finance. (2002). Decree no. 500/2002 Coll., as amended, regulates the Czech accounting standards for entrepreneurs.

Pavláková Dočekalová, M., Kocmanová, A., & Koleňák, J. (30. March 2015). Determination of economic indicators in the context of corporate sustainability performance. *Business: Theory and Practice, 16*(1), S. 15-24. doi:10.3846/btp.2015.450

Vochozka, M. (2011). *Metody komplexního hodnocení podniku* (Bd. 1). GRADA Publishing, a. s.

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