AN INSIGHT INTO VALUE RELEVANCE OF ACCOUNTING INFORMATION : IMPACT OF COVID 19 CRISIS

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Abstract
Value relevance is one of the basic assumptions of quality of accounting information and accounting information is considered to be value relevant when it is associated with share prices. Global crisis caused by COVID 19 pandemic affected all spheres of economy and rose investor's uncertainty to unexpected levels. Due to such considerations it is interesting to analyze how value relevance of accounting information reacted to crisis caused by this pandemic. The aim of this study is to investigate value relevance of accounting information on Croatian capital market in period 2016-2020. Focus is to determine impact of COVID 19 crisis on the value relevance of accounting information. More precisely, authors determine how value relevance of book value and earnings reacted on crises caused by COVID 19 pandemic. Research is conducted on a sample of companies that were listed on Croatian capital market in the observed period. In order to get better insight into research problem, value relevance was analyzed in two periods: pre-crisis period and crisis period. Pre-crisis period included total of 105 firm-year observations while crisis period included 70 firm-year observations. Association between accounting variables and share price was tested by using Feltham and Ohlson's (1995) model. Results show that accounting information on Croatian capital market are value relevant in per-crisis and in crisis period. Moreover, value relevance of earnings and book value increased in observed period but crisis caused by COVID 19 brought a shift in information content of accounting information in favor of earnings. Research results show how book value has greater explanatory power in pre-crisis period while earnings have greater explanatory power in crisis period. When both accounting variables are combined together results also confirm that crisis caused by COVID 19 had negative impact on the value relevance of book value followed by positive effect of the value relevance of earnings. More precisely, during crisis period earnings are statistically significantly correlated to share prices while book value is not correlated with share prices.

Keywords: book value, earnings, value relevance, COVID 19

JEL classification: M41

Introduction

Accounting information provided within financial statements help financial statement users in their decision making process. Therefore, information provided by financial statements should be useful. Useful accounting information has the ability to influence the decision-making process and main characteristics of useful information are importance and reliability. Value

relevance studies represent the simultaneous testing of both the importance and reliability of accounting information and are one of significant areas of accounting research. Literature has provided numerous but similar definitions of the value relevance concept. According to Barth et al. "value relevance studies examine association among accounting information and market variables" (Barth et al., 2001: 95). Der et al. state how "the concept of value relevance in accounting is, therefore, an attempt to link accounting numbers to the market value of ordinary shares" (Der et al, 2016: 9). Francis & Schiper (1999: 327) determine value relevance as "the ability of earnings and book values of assets and liabilities to explain market values of equity." Based on above stated definitions it can be summarized how value relevance is determined by statistical association between accounting information (book value and earnings) and share prices. Thus, for certain information to be value relevant it must be correlated with the market value of the company. Large number of studies examined informational content of book value and earnings. Results of such studies reported how accounting information are value relevant i.e. have information content (Pervan & Bartulović, 2014, Belesis et al. 2016, Der et al. 2016…).

Cross time value relevance studies investigate importance of accounting numbers in firm valuation in longer time periods and results of conducted studies show opposite results and there is still no uniform conclusion as to whether the value relevance of book value and earnings has increased or decreased over time. Special stream of value relevance studies is focused on determining impact of crisis on value relevance. Authors notice how "the heightened volatility of markets during periods of financial distress requires the determination of value relevance during these periods" (Eugenio et al., 2019: 134) and examine whether "investor trust financial statements in critical times" (Tahat & Alhadab, 2017: 1). As examples, studies performed by Eugenio et al. (2019), Shahbaz (2019), Belesis et al (2016) and Devalle (2012) can be pointed out. Some authors point out how "financial crisis has a positive impact on value relevance" (Devalle, 2012: 201) while others find "inconsistencies in relative value relevance" (Eugenio et al., 2019: 133) and suggest further research. Shahbaz (2019) points out how "book value is value relevant pre and post crisis" while "there is a decline in significance of earnings subsequent to the Global Financial Crisis" (Shahbaz, 2019: 8). Belesis et al. (2016) found that "the value relevance of earnings and book value decreased due to the event of the financial crisis". It can be concluded that there is no unique conclusion related to impact of financial crisis on the value relevance of accounting information and further research in this area could provide new contribution in understanding the concept of value relevance in times of crisis. To our best knowledge only rare publications (e.g. Aljawaheri et al. 2021) analyzed impact of COVID 19 pandemic which "has shocked the entire global economy" (Sun et al, 2021, in Aljawaheri et al 2021: 707) on value relevance of accounting information.

In light of those considerations, the purpose of this paper was to analyze impact of COVID 19 pandemic on value relevance of accounting information on Croatian capital market. More precisely, objective of this study is to determine value relevance of book value and earnings and to determine changes in value relevance during crises period compared to pre-crisis period on the Croatian capital market. COVID 19 pandemic caused crisis in global economy and "the markets responded to the CORONA pandemic with sharp declines, and investor uncertainty rose to record levels which was not seen since the global financial crisis of 2007-2009" (Aljawaheri et al, 2021: 708). Therefore, it is necessary to analyze impact of such unpredicted and sudden event on value relevance of accounting information i.e. book value and earnings "that have been of interest when making investment and credit decisions" (Tahat & Alhadab, 2017: 1). Analysis was performed for period 2016-2020 on a sample companies listed on Zagreb Stock Exchange. Paper contributes to existing literature in the area of value relevance

due to the fact that authors analyze impact of crisis caused by COVID 19 on value relevance of accounting information and try to determine how accounting numbers responded to crisis and how did Croatian capital market react to publication of financial statements in terms of their association to market values. It is interesting to analyze informational content of accounting information in the context of ongoing COVID 19 crisis since the COVID 19 outbreak had intensive impact on the business activities and firm financial performance. Therefore, it is useful to understand in which way it influenced value relevance of book value and earnings on still unexplored, emerging market such as Croatian capital market. This research provided several interesting and novel findings in the area of value relevance. Results indicate how accounting information are value relevant on Croatian capital market even in times of crisis. Moreover, there was a shift in usefulness of accounting information from superiority of book value in pre-crisis period to superiority of earnings in crisis period. Paper is structured as follows. After introductory part, second part of the paper outlines relevant previous research. In the third part statistical methodology and models are presented. Fourth part of the paper discusses empirical results while last part brings concluding remarks.

Literature review

Cross time value relevance studies investigate importance of accounting numbers in firm valuation in longer time periods and results of conducted studies show opposite results. Despite different studies there is still no uniform conclusion as to whether the value relevance of book value and earnings has increased or decreased over time. For example, changes in combined, individual and incremental value relevance of accounting information for Indian firms were examined by Khanna (2014). Results indicate decline in combined value relevance of accounting information while changes in incremental value relevance were insignificant. Bartulović (2015) conducted research on Croatian capital market in period 2009-2013. Results indicate oscillations in value relevance in the observed period. The analysis of the value relevance of book value and earnings showed differences in the value importance of these variables and it can be concluded that on Croatian capital market investors attach more importance to accounting information presented in the balance sheet than accounting information presented in the income statement. Der et al. (2016) analyzed value relevance of accounting information for companies in the Singapore capital market. According to research results book value has greater explanatory power than earnings. Author points out how "the value relevance of some accounting variables has increased over time, while others showed no evidence of their inclined or declined patterns in the value relevance of accounting information" (Der et al., 2016: 9).

Previous research show that accounting information (first of all earnings and book value) are value relevant i.e. these variables are significantly related to share prices. However, it is interesting to analyze what happens with value relevance of accounting information in period of crisis. The authors again began to question the usefulness of accounting information and information content they provide in equity valuation during turbulent times of crisis. As examples of those studies, research conducted by Devalle (2012), Bepari et al (2013), Belesis et al (2016), Tahat & Alhadab (2017), Shahbaz (2019) and Eugenio et al (2019) can be pointed out. They all examined impact of financial crisis on value relevance of accounting information and tried to answer question whether accounting numbers, i.e. earnings and book value lost their relevance during financial crisis. Devalle (2012) analyzed impact of financial crisis on value relevance of accounting information in Europe for period 2006-2009. Author examined value relevance in pre-crisis period (2006-2007) and during in-crisis period and came to results

that “the financial crisis has a positive impact on value relevance”. (Devalle, 2012: 201). Value relevance of earnings and cash flows during financial crisis was investigated also by Bepari et al (2013). Their research was performed on Australian capital market and results showed how earnings is better variable for explaining stock prices that cash flows. Also, value relevance of earnings increased during the crisis period while value relevance of cash flow decreased (Bepari et al, 2013: 243).

Belesis et al. (2016) examined impact of financial crisis on value relevance of earnings and book value at a sample of companies included in Standard & Poor's 500 Index. Research period was 2002-2014. Results indicate how financial crisis caused decline in value relevance “as the crisis has created an increase in uncertainty about the financial position of companies” (Belesis et al., 2016: 1). Tahat & Alhadab (2017) conducted a research on a sample of 350 UK largest non-financial companies and examined weather accounting number lost relevance during financial crisis. Authors examined value relevance of accounting variables over three periods of time: pre-crisis, in-crisis and post-crisis time. Research results reveal how book value is relevant in all three observed periods but slight decline is observed during in-crisis period. Based on such trend authors conclude how “usefulness of accounting information may have been harmed in such time” (Tahat & Alhadab, 2017: 5). Variable earnings is also value relevant in all three periods with a slight increase in explanatory power during crisis period. Despite this fact it should be emphasized how in all periods explanatory power of book value is greater that explanatory power of earnings meaning that “book value can, to a very high degree, explain cross variations in firms' market values as compared to EPS” (Tahat & Alhadab, 2017: 5). For example during period of crisis explanatory power of book value equals 0.82 while earnings reach value of 0.69. Furthermore authors conclude how results are in line with prior research which indicated how value relevance of book value increased while value relevance of earnings decreased over time (Harris et al., 1994. in Tahat & Alhadab, 2017: 6). It is interesting to note how explanatory power increases when both accounting variable are combined together and during period of crisis book value and earnings explain 84% variations in firms' market values.

Eugenio et al. (2019) examined impact of financial crisis on value relevance of accounting information on a sample of non-financial firms in East Asia. Main research question was “how does value relevance of accounting information differ before, during and after the 2008 global financial crisis” (Eugenio et al., 2019: 134). Research results showed inconsistencies in value relevance during examined period since book value is positive and significant in all periods (pre-crisis, in-crisis and post-crisis) while value relevance of earnings is decreasing during in-crisis period. This was explained by remark how “users of financial reports may have higher regard on financial position than financial performance during the in-crisis period” (Eugenio et al., 2019: 136). It is also interesting to point out how when earnings and book value are analyzed together results show how in pre-crisis period value relevance of book value decreased while variable earnings was not significant. During the crisis both variables were not significant and they became again significant after crisis. Shahbaz (2019) examined value relevance of accounting information on a sample of 81 company listed on Pakistan Stock Exchange and impact of financial crisis on the value relevance. According to research results “crisis affects negatively the significance of the accounting data” (Shahbaz, 2019: 13). Moreover, book value is value relevant in times of crisis while variable earnings is insignificant. One of the rare studies dealing with impact of COVID 19 on value relevance was performed on the Iraq Stock Exchange by Aljawaheri et al. (2021). Authors, among other, examined impact of COVID-19 Lockdown on the value relevance of accounting information. According to research results investors respond negatively to COVID 19 pandemic since the value relevance of both earnings and book value are affected negatively (Aljawaheri et al, 2021: 713).

Research methodology

Previous research in this area show that accounting information (first of all earnings and book value) are value relevant i.e. these variables are significantly related to share prices. However, it is interesting to analyze what happens with value relevance of accounting information in period of crisis such as one caused by COVID 19. In order to get better insight into research problem, value relevance was analyzed in two periods: pre-crisis period (2016-2018) and in-crisis period (2019-2020). Association between accounting variables and share price was tested by using Feltham and Ohlson's (1995) model. Model was used in previous value relevance research (for example see: Francis & Schipper, 1999, Pervan & Bartulović, 2014, Der et al. 2016.).

This model expresses market value as function of earnings and book value as follows:

$$P_{it} = a_0 + a_1 E_{i,t} + a_2 BV_{i,t} + e_{i,t} \quad (1)$$

where:

P_{it} – share price at the end of April in year t+1,
E_{it} – earnings per share in year t,
BV_{it} – book value per share at the end of year t,
e_{it} - other value relevant information in year t.

Value relevance of accounting information is expressed through obtained adjusted R-squares. Moreover, book value and earnings are considered to be value relevant when regression coefficients on these variables are positive and significant. In order to investigate value relevance of earnings and book value separately model is decomposed and specific models are:

$$P_{it} = b_0 + b_1 E_{i,t} + e'_{i,t} \quad (2)$$

$$P_{it} = c_0 + c_1 BV_{i,t} + e''_{i,t} \quad (3)$$

Models 1-3 provide information on value relevance of accounting information through adjusted R-squares or explanatory power of earnings and book value. Model 1 provides information on combined explanatory power of earnings and book value while model 2 and 3 obtain information on individual explanatory power of these variables.

Research sample and data

The research sample consists of nonfinancial companies listed on the Zagreb stock exchange. Companies were included in the sample according to the turnover criteria. More specifically, in order to include only the most active companies – i.e. companies whose shares were actively traded in observed period, authors determined that sample shall include only companies whose turnover exceeded 5.000.000 HRK in year 2016 (which is the first year of analysis). Due to such criteria 35 yearly observations or totally 175 firm-year observations in period 2016-2020 were included in analysis. Financial companies were excluded from the sample due to their accounting and reporting specificities as well as strict supervision by Croatian National Bank. Data on accounting variables – earnings per share and book value per share were collected from Orbis database while information on share prices were taken from Zagreb Stock Exchange web page (wwe.zse.hr). Descriptive statistics for analyzed variables is presented in Table 1.

Table 1: Descriptive statistics for the period 2016-2020

	N	Mean	Median	St. Dev.	Min	Max
P	175	1,431.26	390.10	3,088.92	2.06	20,866.67
E	175	7.90	1.59	63.59	-484.09	337.97
BV	175	192.74	48.77	456.21	-117.28	2.398.37

Source: author's calculation

Share price ranges from minimum 2.06 to maximum of 20.866,67. Mean value is 1,431.26 with high standard deviation of 3,088.92 which indicates high share volatility at Croatian capital market in the observed period. In multiple regression models, there is a possibility of the multicollinearity problem between regression variables. In order to check this issue, the statistical package SPSS, which was used to process the data in this study, applies the Variance Inflation Factors. If the Variance Inflation Factors are less than 5, it can be concluded that there is no multicollinearity problem, however, some authors believe that the Variance Inflation Factors can be up to 10 and that yet multicollinearity is not considered a significant problem (Tahat et al, 2016). In the analyzed multiple regression models Variance Inflation Factors are less than 5 which indicates that there is no multicollinearity problem.

Research results

In order to test impact of crisis on the value relevance of accounting information on the Croatian capital market authors tested value relevance in pre-crisis period which covers 2016, 2017 and 2018 and in crises period covering two COVID years 2019 and 2020. When analyzing value relevance of earnings (Table 2), results indicate that earnings are positively and significantly related to share prices in both observed periods. It is interesting to note how value relevance of earnings increased during the crisis period (Adj. R-square 0.674) in comparison to pre-crisis period (Adj. R-square 0.241).

Table 2: Value relevance of earnings in pre-crisis and crisis period

	Model 2 Pre-crisis period	Model 2 Crisis period
Constant	1,343.748 (0.0001)	789.994 (0.001)
E	0.499 (0.0001)	0.824 (0.0001)
Adj. R-square	0.241	0.674
N	105	70

Source: author's calculation

Book value, when observed separately, is also positively and statistically correlated with share prices in both periods (Table 3). Explanatory power increased from 0.393 in pre-crisis period to 0.522 in crisis period. When comparing explanatory power of earnings and book value in pre-crisis and crisis period it can be noted how value relevance of both variables increased in observed period, but earnings have greater explanatory power in crisis period (Adj. R-square for earnings amounts 0.674 while Adj. R-square for book value amounts 0.522). On the other hand, book value has greater explanatory power in pre-crisis period. Such results indicate shift in value relevance in times of crisis on Croatian capital market. According to research results, in times of crises investors attach more importance to information published in profit and loss account than to those published in balance sheet.

Table 3: Value relevance of book value in pre-crisis and crisis period

	Model 3 Pre-crisis period	Model 3 Crisis period
Constant	612.625 (0.013)	477.529 (0.112)
BV	0.632 (0.0001)	0.728 (0.0001)
Adj. R-square	0.393	0.522
N	105	70

Source: author's calculation

Research results presented in Table 4 show that when observed together, earnings and book value are value relevant, i.e. correlated to share prices. More precisely, in pre-crisis period research findings indicate positive and statistically significant association between share prices on one hand and accounting variables on the other hand. Results show that earnings and book value are value relevant but however in pre-crisis period book value has greater impact (coefficient amounts 0.510) on share prices than earnings (coefficient amounts 0.245).

Table 4: Value relevance of accounting information in period 2016-2020

	Model 1 Pre-crisis period	Model 1 Crisis period
Constant	727.925 (0.003)	692.582 (0.007)
E	0.245 (0.005)	0.703 (0.0001)
BV	0.510 (0.000)	0.146 (0.236)
Adj. R-square	0.433	0.676
N	105	70

Source: author's calculation

During crisis period combining two accounting variables together results in conclusion how earnings are statistically significant while book value is not correlated with share prices. This suggests how in turbulent time investors attach more information on financial performance than on financial position. Such results are in line with prior research in this filed which indicated that value relevance of earnings increased in crisis times (for example Bepari et al, 2013) but also opposite to those studies that found decrease in value relevance of earnings during times of crisis (for example Eugenio et al. 2019 and Shahbaz, 2019). Results suggesting how value relevance of book value was harmed in times of crisis are in line with results of Eugenio et al. (2019) and Belesis et al. (2016) but opposite to findings of Shahbaz (2019).

Research results indicate how on Croatian capital market in times of crisis earnings are value relevant while book value is not and usefulness of book value was harmed in times of crisis. The explanatory power of combined model increased in crisis period (Adj. R-square 0.676) in comparison with pre-crisis period (Adj. R-square 0.433). Such results are in line with results of Devalle who concluded how financial crisis has positive impact on value relevance of accounting information but also opposite to results of Shahbaz (2019) who concluded that crisis negatively affected the value relevance of accounting data. It can be concluded that when interpreting research results in context of previous research in this filed, it can be concluded that there is no unique conclusion and that further efforts should be made in order to determine impact of financial crisis on the value relevance of earnings and book value.

Conclusion

This research provides new evidence on value relevance of earnings and book value on relatively small and emerging market with special emphasis on impact of crisis caused by COVID-19 on relevance of accounting information. Research provides additional, new contribution by questioning value relevance of earnings and book value before and during crisis caused by COVID-19. It provides insight how market values responded to publication of financial statements during turbulent and uncertain times of crises. Research results indicate how earnings and book value, observed separately, are value relevant in both periods. Moreover, book value has greater explanatory power than earnings in pre-crisis period while situation is opposite during crisis period. Combining earnings and book value in the same model shows that in pre-crisis period both accounting variables are value relevant while during turbulent, crisis times, book value is not value relevant. Research provides evidence on superiority of earnings over book value in the crisis period since book value is not statistically significant variable when combining both variables together. Also when analyzing separate models earnings have superiority over book value during crises period since earnings reveal a higher explanatory power which amounts 0.674. On the other hand, explanatory power of book value in crisis period amounts 0.522.

Results prove evidence that in times of crisis investors focus more on earnings than on book value in determining market value of company and this can be attributed to the fact that in turbulent, crisis times, investors focus on simple measures and one of the primarily is earnings per share. Sidhu & Tan (2011) argue that in times of financial crisis "the focus on a reliable benchmark such as earnings per share may increase due to the level of noise in other sources of information such as analyst's forecasts" (Sidhu & Tan, 2011. in Bepari et al., 2013: 245). Earnings per share is a key measure that investors focus upon crisis time meaning that they focus more on capability of company to make earnings than on financial position. It should be pointed out how there are inconsistencies in research findings in this filed. While some authors found positive impact of financial crisis on value relevance of earnings (Bepari et al, 2013) which is in line with research within this paper, other evidenced negative impact of crisis on informational content of earnings (Eugenio et al. 2019 and Shahbaz, 2019). Conclusions are similar when analyzing value relevance of book value. Inconsistency in the results of existing research requires further research in this area in order to determine impact of financial crisis on the value relevance of accounting information. This paper is first attempt that examines value relevance of accounting information during two periods: pre-crisis and crisis period on Croatian capital market. However, research was conducted on a single country and further research should focus on a cross country perspective.

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