Market Value Added (MVA) and Total Shareholder Return (TSR) among IT and video game companies listed in Warsaw Stock Exchange

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Abstract: Nowadays, the measurement of a company's performance seems to be complex. There are many classical accrual indicators of profitability, like ROA, ROE and EPS. However, the concept of focusing on maximization value for owners has its influence on the main aim of the functioning of business entities. Because of it, and of disadvantages of previously mentioned measures, new ones, referred to value added for shareholders, have been created. Indicators like EVA, MVA and TSR led to the estimation of value created by the company. The aim of this paper is to analyze the added value created by chosen listed companies. The empirical research was focused on comparing added value for shareholders with risk and accrual indicators by using descriptive statistics and correlation. The level of risk among analyzed companies (from IT and video game sector, listed on Warsaw Stock Exchange) was different—quite high for entities, which activity is connected with the video games industry, and lower for IT companies. In general, MVAs and TSRs were characterized by the high volatility of their values. What is more, the higher risk was not related to higher rates of return (measured by TSR). Moreover, there were no significant relationships between accrual indicators and value added measures. What is worth mentioning, the result of the analysis differs from the studies mentioned in the paper. It might be caused by specific sample selection.

Keywords: effectiveness indicators, rates of return, accrual indicators, correlation, profitability

1. Introduction

In the assessment of the economic condition of enterprises, there are some quite popular ways to measure their profitability. Financial ratios like Return On Assets, Sales or Equity (in sequence: ROA, ROS, ROE) are commonly known. The main advantage of using them is the possibility to measure the ability to generate profit according to almost all types of business entities. On the other hand, in the case of public limited companies, there is another eventuality—taking advan-

tage of measures connected with return on equity (related to stock prices). This possibility is giving an insight into the creation of added value for shareholders. For this reason, it seems that these measures make sense and might be a source of valuable information not only for investors, but also for the market outside. Hence, the aim of the paper is to analyze the added value created by listed companies. The study was based on data from companies from the IT and video games industries, due to their popularity and growth even in the pandemic period. A novelty is the market added value study based on a set of Polish companies from these sectors. In addition, the years included in the analysis are the present period, which affects the timeliness of this analysis.

As a part of this paper, the focus was on measuring Market Value Added (MVA) and Total Shareholder Return (TSR), which present cash benefits which might be achieved by investors. Moreover, connections between these measures and risk and also accrual financial data were taken into account in further analysis. Companies chosen for this purpose come from IT and video game sectors. The first part of the paper refers to the theoretical view on creating added value for capital market entrants. It consists of literature review focused on returns for shareholders as well as studies linked with a subject. The next fragment shows briefly formulas applied for calculating MVA and TSR and the rationale for their use. The last section embraces computed measures and a trial for estimating their connections with classical financial ratios and economic categories.

2. Literature review

Nowadays, measures based on the accrual approach to profitability are still commonly used, as several dozen years ago. There are existing some advantages of applying them, which determine their usefulness, like the simplicity of calculating and quite high comparability among companies functioning in different fields of economy. However, it is worth emphasizing the defects of their using, too. Among them might be mentioned for instance:
  – accrual financial result includes balance sheet structure and tax strategy, therefore it might not reflect well results generated by activities in industry;
  – accrual measures are expressed in cash values, they are size-dependent of a company;
  – cash flows and the cost of capital are not taken into account when calculating financial results based on the classic approach (Szczukiewicz, 2003).

Disadvantages of accrual indicators led to research for other measures, which are able to take into account the creation of value added for shareholders. It is connected with the purposes of the functioning of business entities, too—generating profits used to be known as the main aim, while nowadays maximizing value for owners is considered as a better one (Damodaran, 2014). Moreover, recently interest in Value Based Management (VBM), a concept linked with focusing on value creation, has been increased—it is actually one of the most commonly used strategies of company management. One of the main premises of using VBM in business entity management is to reduce the difference between the potential and present market value of a company (Jóźwiak, 2020).

Regarding the VBM concept, different value drivers are distinguished in the literature of the subject. Fulfilling them should ensure an increase in added value of the company. They include for instance:

– increase in net sales revenues;
– cash margin of operating profit;
– cash tax rate;
– the level of working capital;
– investments in tangible fixed assets;
– WACC (Weighted Average Cost of Capital);
– average duration of the increase in value (Rappaport, 1986).

All of the categories presented above are differently perceived by the market. An increase in net sales allows the expansion of the activities of a company. Margin changes allow for optimization of the added value generated from 1 product. The cash tax rate is a relevant factor of company policy. Working capital is the means necessary for the proper functioning of the company. Investments in tangible fixed assets allow the company's development in the long term. WACC is the benchmark for assessing the profitability of investment projects, and it reflects opportunity cost in the context of running a business. The duration of the increase in value is the period in which investment returns exceeded the WACC. All of these quantities determine the increase in value added for a company.

Taking everything into account, it can be stated that as a result of weaknesses of accrual measures and focus on maximizing value for shareholders (also included in the VBM concept) there was a need to look for new measures of company performance. There arose many commonly used measures of benefits for shareholders, however it is unclear, which of them is the most suitable one. The most frequently used can be divided into 2 groups:

1) created value indicators:
   – Economic Value Added (EVA);
   – Market Value Added (MVA);
   – Shareholder Value Added (SVA);

2) total return indicators:
   – Total Shareholder Return (TSR);
   – Total Business Return (TBR).

The first of them, highly likely the most commonly known, is EVA. This concept was created by Stern Stewart & Co., it gained popularity in the 1990s. The formula of Economic Value Added include operating profit, income tax and cost of capital. Another concept is MVA. It might be considered as a present value of discounted EVAs until the end of the business (Kacprzyk, Rychter and Wolski, 2009). For listed companies, it may be computed in a quite simple way, using share prices. MVA shows a shift in shareholders' wealth between the moment when the capital was invested and the time of measurement. It is worth underlining that EVA is conditioned by the internal situation of the company, where MVA is determined by external factors, connected with assessment of the entity by the market (Mikołajek-Gocejna, 2010).

The second group of effectiveness indicators of value added are focused on measuring return for investors as a relative quantity. TSR indirectly includes fundamental parts of the company's functioning—the result of operating activity, changes in the capital market, finan-

cial leverage. It is used as a long-term indicator of a company's success achieved by creating value for shareholders (Shah and Sengupta, 2015). Beyond the presented division, there is also another one—there are internal (e.g. EVA) and external (e.g. MVA, TSR) measures of value added for shareholders. The empirical part of this paper is focused on the external ones.

In general, there are many reasons for using measures based on creating value added for shareholders. Pressure from investors, understanding the concept of created value among managers, other circumstances, for instance referred to behavioural aspects—the sense of comfort as a result of using commonly approved measures—there are just some of them, in relation to shareholders (Szczukiewicz, 2003). The concepts like EVA, MVA or TSR can provide a better view of the company's current situation and the perspective of the future. Traditional measures, like ROI or EPS, take into account only costs connected with capital, they overlook many essential areas (Shah and Sengupta, 2015). Further, it is pointed out that comparing the economic return with the cost of capital is relevant. The company might be considered as a profitable one, when after covering costs of activities it is providing firm returns for owners. Moreover, these earnings should not be lower than the cost of equity (Nowicki, 2018). Such an approach is able to provide measures based on the creation of added value. On the whole, measures of a company's performance, which are using market values, might be considered as valuable instruments to estimate, how the present situation of the company and its forecasts are perceived by the external entities and investors.

In the literature of the subject, there can be found some examples of analyses focused on the dependence between value creation measures and random variables. Cucari, Mazza, Constantini and Sancetta (2016) analyzed relationships between CEO (Chief Executive Officer) Pay and TSR. They considered 40 companies listed on Milan Stock Exchange in the period 2008–2014. Eventually, their study did not confirm the correlation between CEO Pay and TSR. However, the results of the analysis performed on the example of entities listed on the Johannesburg Securities Exchange, in the years 2006–2010, were different. There was pointed out the existence of a significant relationship between the executive compensation and measures of financial performance (not only ROA or ROE, but also EVA and MVA). Especially, for companies generating a high level of EVA there were observable stronger relationships between executive compensation and MVA (De Wet, 2012). Another study was focused on the competitiveness of the companies and their interdependence with value added. The author stated that the company's stakeholders are the beneficiaries of its value. For this reason, it is required to enable reconciliation of needs of different groups (shareholders, managers, employees, clients, suppliers, etc.). Companies included in the study come from the construction sector of the Warsaw Stock Exchange (WSE), data was collected for 2012. As a part of that work, it was indicated that there is existing dependence between market share in sales (as a measure of competitiveness) and value added (Grabowska and Otola, 2013). In research on measures of added value, analyses based on data from listed companies with low capitalization can also be extracted. An example is research of companies with capitalization not higher than 100 million PLN listed on Main Market of WSE in the period 2011–2012. The study found an average negative level of profit and EVA. The author explained it with a bad situation of the Polish economy after the crisis, which had started in 2008 (Wypych, 2013). Another analysis, focused on smaller listed companies too, was conducted on the ex-

ample of 6 companies with the lowest capitalization on WSE. The period taken into account is 1999–2009. Attention has particularly been paid to low market efficiency in relation to entities taken into account, for instance due to a small number of free float shares and, in effect, to low interest from institutional investors. The result of that study showed that MVA does not explain the changes in share prices better than the net profit (Kicia, 2010). The next research took into account 20 companies from the Indian Cement Industry, in the period 2005–2015. The study was focused on correlations between EVA, MVA and rates of return. The authors showed the existence of a relationship between the mentioned measures (Kiran Kumar and Subramanyam, 2017). Another research, conducted on a sample of 22 companies listed on Bombai Stock Exchange in the period 2009–2014, took into account relationships between MVA and accounting indicators (EPS, ROA, ROE, ROS). The authors found significant correlations between MVA and EVA, also between MVA and EPS (Rajan, Ravi and Ashafaque, 2015).

Overall, there are many studies that try to link measures such as MVA or TSR to financial indicators and other economic variables. Depending on the research sample, their results often differ. Therefore, it can be said that there are needed further research taking relationships between value added measures and previously indicated variables into account in various aspects.

Considering the presented outline of theory and the examples of research, the aim of this study was formulated. This purpose is to check whether there is any dependence between these measures and risk and accrual indexes, among the IT and video games industry. The following hypotheses were put forward:

1) the level of risk of IT and video game companies is, on average, higher than for benchmark;
2) value added measures are characterized by the occurrence of high volatility among companies from IT and video game industries;
3) higher risk, measured by the beta coefficient, is connected with higher rates of return;
4) there are positive dependencies between values of accrual indicators and value added measures.

3. Analysis methods and sample

The measures related to the company's performance used in this study are MVA and TSR (with its variants ETSR and RTSR). The formula of Market Value Added, for listed companies, is as follows (Kacprzyk, Rychter and Wolski, 2009):

$$\text{MVA} = \text{number of shares} * \text{market value of shares} - \text{book value of equity} \qquad (1)$$

MVA could be considered as the hypothetical difference between the sale value of all shares at a current moment and the invested capital (Mikołajek-Gocejna, 2010).

The next measure taken into account is Total Shareholder Return. It is calculated in that way (Comporek, 2018):

$$\text{TSR} = \frac{P_c - P_s + \text{DPS}}{P_s} \qquad (2)$$

where:
P$_c$—current price
P$_s$—starting price
DPS—dividend per share.

In relation to this indicator, it is worth pointing out that TSR is commonly used among companies listed on S&P1500—almost 50% of them are taking advantage of it (Cucari et al., 2016).

Excess Total Shareholder Return (ETSR), apart from TSR, includes also an opportunity cost, for instance cost of equity The formula for its computing is (Comporek, 2018):

$$ETSR = TSR - K_e \qquad (3)$$

where:
K$_e$—the cost of equity (computed on the basis of CAPM model):

$$K_e = r_f + \beta * rp \qquad (4)$$

where:
r$_f$—risk-free rate (10-year treasury bond yield, calculated at the beginning of a year taken into account)
β—stock price sensitivity factor to changes in the benchmark
rp—risk premium, considered as Country Risk Premium, according to Damodaran (2020).

Relative Total Shareholder Return (RTSR) is calculated among a group of companies and led to extract business entities, which are characterized by achieving above-average rates of return. It is calculating as follows (Comporek, 2018):

$$RTSR = TSR - \overline{TSR} \qquad (5)$$

This measure allows highlighting entities performing better than the market or the analyzed group.

The companies taken into account were chosen because of the availability of stock quotes for not less than 5 quarters (to the date of 30 October 2020). The beta coefficient has been determined on the basis of closing prices of individual companies, WIG (Warsaw Stock Exchange Index) and NCIndex (NewConnect Index). The period included in calculations is 2 January 2019–30 October 2020. The group of analyzed companies includes entities operating in IT (26 from WSE Main Market and 3 from NewConnect) and the video game sector (in sequence: 9 and 16). The first reason for choosing this group of entities was connected with their popularity and development in recent years, especially reflected in considerable fluctuations, usually increases, of stock prices. Another one has a source in COVID-19 pandemic—these economic areas were not strongly affected by this random event, so they can be considered as operating under normal market conditions. The data was obtained from the Biznesradar website (https://www.biznesradar.pl/).

4. Empirical analysis of TSR and MVA

It is worth noting that wherever 17 appears in the name of the indicator, it means 2017, and the same is true for 18 (2018), 19 (2019) and 20 (2020—the period between 2 January and 30 October). Initially, it is worth presenting beta coefficients for analyzed companies. It is shown in Table 1.

Table 1. Beta coefficients[1]

Company	Beta	B-k	Company	Beta	B-k
Ailleron (AIL)	1.29	WIG	Bit Evil (BIT)	0.71	NCIndex
Asseco Business Solutions (ABS)	0.51	WIG	Blackpoint (BLP)	0.60	NCIndex
Asseco Poland (ASP)	0.42	WIG	Xplus (XPL)	0.49	NCIndex
Asseco South Eastern Europe (ASE)	0.62	WIG	7Levels (7LV)	0.82	NCIndex
Atende (ATE)	0.55	WIG	Bloober Team (BLT)	1.35	NCIndex
Betacom (BET)	0.66	WIG	Creativeforge Games (CRE)	1.31	NCIndex
Comarch (CCH)	0.49	WIG	Creepy Jar (CRJ)	1.01	NCIndex
Comp (COM)	0.14	WIG	Draw Distance (DDI)	0.90	NCIndex
Datawalk (DAT)	1.24	WIG	Prime Bit Studios (PBT)	0.94	NCIndex
Digitree (DIG)	0.72	WIG	The Dust (TDU)	0.71	NCIndex
Ifirma (IFI)	0.56	WIG	Cherrypick Games (CHG)	0.41	NCIndex
K2 Internet (K2I)	0.52	WIG	Forever Entertainment (FRE)	1.11	NCIndex
Livechat (LIV)	0.52	WIG	Jujubee (JUJ)	0.88	NCIndex
LSI Software (LSI)	0.67	WIG	No Gravity Games (NGG)	1.42	NCIndex
NTT System (NTT)	0.20	WIG	One More Level (OML)	1.56	NCIndex
Opteam (OPT)	0.05	WIG	Qubic Games (QUB)	1.19	NCIndex
PGS Software (PGS)	0.94	WIG	The Farm 51 Group (F51)	1.18	NCIndex
Procad (PRO)	0.03	WIG	Varsav Game Studios (VGS)	1.26	NCIndex
Quantum Software (QUA)	-0.01	WIG	Neurone Studio (NEU)	1.21	NCIndex
Silvair (SIL)	0.29	WIG			
Simple (SIM)	0.41	WIG			
Sygnity (SYG)	1.00	WIG			
Talex (TAL)	0.44	WIG			
Unima 2000 (U2K)	0.44	WIG			
Wasko (WAS)	0.55	WIG			
Elzab (ELZ)	0.63	WIG			
CD Projekt (CDP)	0.85	WIG			
11 Bit Studios (11B)	0.85	WIG			
Artifex Mundi (ART)	1.09	WIG			
CI Games (CIG)	1.45	WIG			
PlayWay (PLW)	1.29	WIG			
T-Bull (TBL)	1.43	WIG			
Ultimate Games (ULT)	1.52	WIG			

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[1] B-k—benchmark.

Company	Beta	B-k	Company	Beta	B-k
Ten Square Games (TSG)	1.08	WIG			
Vivid Games (VIV)	1.00	WIG			.

S o u r c e: Biznesradar, 2020.

Quite surprising were observations for Sygnity and Vivid Games, where beta coefficients took values very close to 1, which does not happen often. It indicates that share prices of these companies fluctuated on average as much as on the market. In general, most companies' beta was below 1 (63% entities). It means that fluctuations of stock prices of these enterprises were not as strong as for benchmark (WIG or NCIndex). Theoretically, these companies were characterized by a lower level of risk than the average on the market. However, it is necessary to pay attention to the distribution of coefficients by industries, as shown in Table 2.

Table 2. Distribution of beta coefficients by industries

Industry	WIG			NCIndex		
	$\beta>1$	$\beta\approx1$	$\beta<1$	$\beta>1$	$\beta\approx1$	$\beta<1$
IT	2	1	23	–	–	3
Video games	6	1	2	10	–	6

S o u r c e: Author's own elaboration.

In the case of the IT industry, almost 90% of companies were characterized by the volatility of share prices at a lower level than for the market. For entities, which activity is focused on video games, there were observable different situations—values of beta coefficients for most of them (64%) were above 1. Overall, it can be said that on average the analyzed IT companies are characterized by lower risk than the market, while for entities active in the video games industry occurred higher risk. Therefore, the first hypothesis was only partially confirmed—in relation to the gaming industry.

The next part of the analysis embraced calculations of MVA, TSR, ETSR and RTSR. MVAs are estimated for values observed at the end of the year (2018 or 2019). TSR and its variants are stream variables: "2019" means that there were computed quantities for 30 December 2019, in relation to 2 January 2019. The period called "2020" is the time between 2 January 2020 and 30 October 2020, due to the time of writing this paper.

Table 3. Calculated MVA, TSR, ETSR and RTSR 2018–2020

	MVA 18	MVA 19	TSR 19	TSR 20	ETSR 19	ETSR 20	RTSR 19	RTSR 20
AIL	4.300E+07	1.560E+07	–23.15%	–30.11%	–35.20%	–33.30%	–123.68%	–52.98%
ABS	5.439E+08	5.853E+08	10.56%	39.88%	4.08%	37.35%	–53.69%	–19.27%
ASP	–2.266E+09	–6.966E+08	52.93%	18.71%	47.10%	16.25%	–74.86%	23.10%
ASE	–1.954E+08	4.658E+08	123.37%	90.97%	116.11%	88.34%	–2.60%	93.54%

	MVA 18	MVA 19	TSR 19	TSR 20	ETSR 19	ETSR 20	RTSR 19	RTSR 20
ATE	5.509E+07	4.461E+07	4.42%	–3.42%	–2.34%	–5.99%	–96.99%	–25.41%
BET	6.609E+06	–1.866E+06	–34.05%	19.57%	–41.60%	16.90%	–74.00%	–63.88%
CCH	3.627E+08	5.618E+08	26.68%	11.59%	20.34%	9.08%	–81.98%	–3.15%
COM	–1.995E+08	–1.059E+08	41.63%	–4.09%	37.79%	–6.31%	–97.66%	11.80%
DAT	1.101E+07	–1.152E+07	–51.90%	74.60%	–59.88%	71.89%	–18.97%	–81.73%
DIG	1.159E+07	3.395E+07	76.81%	–27.88%	69.18%	–30.55%	–121.45%	46.97%
IFI	2.774E+07	6.388E+07	93.20%	166.67%	90.01%	164.52%	73.10%	63.37%
K2I	–1.236E+07	–1.446E+07	–45.75%	71.43%	–48.80%	69.30%	–22.14%	–75.58%
LIV	–3.714E+07	–5.896E+07	20.16%	–2.50%	17.39%	–4.60%	–96.07%	–9.67%
LSI	1.617E+08	6.603E+07	–47.02%	–10.05%	–51.93%	–12.40%	–103.62%	–76.85%
NTT	–1.032E+08	–1.092E+08	–1.12%	88.41%	–6.88%	85.96%	–5.16%	–30.95%
OPT	–2.333E+07	–2.491E+07	0.52%	50.84%	–5.46%	48.36%	–42.73%	–29.31%
PGS	4.736E+07	1.741E+08	114.90%	243.75%	103.21%	240.60%	150.18%	85.07%
PRO	–6.572E+06	4.099E+06	75.81%	29.49%	68.97%	26.91%	–64.08%	45.98%
QUA	1.446E+07	9.783E+06	–11.50%	73.63%	–18.05%	71.08%	–19.94%	–41.33%
SIL	5.658E+08	1.063E+09	92.87%	121.75%	86.32%	119.20%	28.18%	63.04%
SIM	1.386E+07	1.054E+07	3.13%	29.74%	–1.14%	27.46%	–63.83%	–26.70%
SYG	2.139E+08	2.334E+08	21.11%	21.84%	11.56%	18.94%	–71.73%	–8.72%
TAL	6.999E+06	4.060E+06	–7.64%	195.38%	–17.62%	192.44%	101.81%	–37.47%
U2K	1.780E+07	2.341E+07	35.99%	–3.03%	30.01%	–5.50%	–96.60%	6.16%
WAS	–1.021E+08	–1.224E+08	–12.23%	13.62%	–18.99%	11.05%	–79.95%	–42.06%
ELZ	–1.965E+07	–3.658E+07	–29.52%	36.91%	–36.86%	34.28%	–56.66%	–59.36%
BIT	3.536E+06	6.196E+06	66.34%	47.30%	59.22%	44.69%	–46.27%	36.51%
BLP	–3.168E+06	1.449E+07	107.24%	171.81%	100.90%	169.29%	78.24%	77.41%
XPL	–6.590E+06	–1.020E+07	–46.80%	154.36%	–54.71%	151.65%	60.79%	–76.63%
CDP	1.293E+10	2.576E+10	86.68%	45.89%	77.78%	43.06%	–47.68%	56.85%
11B	4.682E+08	7.951E+08	57.48%	19.48%	48.57%	16.65%	–74.09%	27.65%
ART	1.511E+07	1.382E+07	–26.32%	191.18%	–36.94%	188.15%	97.61%	–56.15%
CIG	5.710E+07	6.646E+07	–1.29%	79.27%	–14.49%	75.94%	–14.30%	–31.13%
PLW	7.648E+08	1.372E+09	74.84%	133.72%	62.80%	130.53%	40.15%	45.01%
TBL	1.884E+07	–2.660E+05	–50.00%	45.58%	–63.05%	42.27%	–47.99%	–79.83%
ULT	5.441E+07	9.256E+07	62.55%	50.58%	48.86%	47.20%	–42.99%	32.72%
TSG	5.188E+08	1.330E+09	164.28%	182.44%	153.73%	179.42%	88.87%	134.45%
VIV	2.077E+07	1.861E+07	–8.30%	64.00%	–18.28%	61.05%	–29.57%	–38.13%
7LV	9.951E+06	1.080E+07	–2.56%	62.50%	–11.26%	59.70%	–31.07%	–32.40%
BLT	4.458E+07	7.865E+07	54.30%	192.83%	41.82%	189.59%	99.26%	24.47%

	MVA 18	MVA 19	TSR 19	TSR 20	ETSR 19	ETSR 20	RTSR 19	RTSR 20
CRE	2.462E+07	2.740E+07	3.93%	125.93%	−8.26%	122.72%	32.36%	−25.90%
DDI	1.434E+07	1.687E+07	13.85%	17.97%	4.58%	15.10%	−75.60%	−15.99%
TDU	2.634E+06	1.552E+07	258.19%	201.95%	250.28%	199.24%	108.38%	228.36%
CHG	7.777E+07	1.298E+07	−67.15%	61.15%	−72.92%	58.70%	−32.42%	−96.99%
FRE	3.775E+07	1.099E+08	131.34%	129.02%	120.58%	125.98%	35.45%	101.51%
JUJ	9.169E+06	2.236E+07	87.78%	22.88%	78.66%	20.04%	−70.69%	57.95%
NGG	1.227E+07	1.912E+07	15.38%	110.34%	2.41%	107.05%	16.77%	−14.45%
OML	4.880E+07	3.817E+07	−3.88%	841.86%	−17.85%	838.44%	748.29%	−33.71%
QUB	7.185E+06	2.005E+07	119.23%	143.26%	107.90%	140.16%	49.69%	89.40%
F51	1.060E+08	1.373E+08	14.38%	−8.46%	3.12%	−11.56%	−102.03%	−15.45%
VGS	5.092E+07	4.308E+07	−7.72%	−12.11%	−19.55%	−15.27%	−105.68%	−37.55%
NEU	3.107E+06	−1.003E+06	−53.95%	170.00%	−65.43%	166.88%	76.43%	−83.78%
CRJ	8.913E+07	1.153E+08	20.82%	432.62%	10.77%	429.66%	339.05%	−9.01%
PBT	3.433E+06	4.291E+06	10.00%	57.78%	0.45%	54.88%	−35.79%	−19.83%

S o u r c e: Author's own elaboration based on financial data of the analyzed companies.

A wide range of data differentiation draws attention. Because of it, it is quite difficult to extract their essence. To get a better insight into already presented data, descriptive statistics were computed for MVAs and TSRs. It has been shown in Table 4.

Table 4. Descriptive statistics for MVAs and TSRs[2]

	MVA 18	MVA 19	TSR 19	TSR 20	ETSR 19	ETSR 20	RTSR 19	RTSR 20
MEAN	2.69E+08	5.98E+08	29.83%	93.57%	21.24%	90.79%	–	–
MED	1.38E+07	1.89E+07	14.12%	59.47%	3.60%	56.79%	−34.10%	−15.72%
SD	1.79E+09	3.51E+09	63.38%	133.96%	63.35%	133.83%	133.96%	63.38%
CV	666.83%	585.87%	212.46%	143.16%	298.24%	147.41%	–	–
MIN	−2.27E+09	−6.97E+08	−67.15%	−30.11%	−72.92%	−33.30%	−123.68%	−96.99%
MAX	1.29E+10	2.58E+10	258.19%	841.86%	250.28%	838.44%	748.29%	228.36%

S o u r c e: Author's own elaboration.

Taking into account measures of volatility, particularly coefficient of variation, there are noticeable their very high values, especially for MVAs. For Market Value Added it is caused by characteristics of its value—as absolute terms. However, for TSRs there was also considerable variability. It indicates that the group is heterogeneous in terms of the achieved rates of return. Mean and median are significantly in plus, which means that most entities achieved

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[2] MED—median, SD—standard deviation, CV—coefficient of variation.

positive added value during the considered period. The highest observable values were startlingly high—the maximum value of TSR exceeded 840%, while the minimum was below –65%. Thereby, the second hypothesis—about the high volatility of the analyzed measures—might be considered as a confirmed one.

As the next part of the analysis, dependencies between beta, a measure of risk, and TSRs were computed. Results are shown in Table 5.

Table 5. Correlation between β and TSRs[3]

	TSR 19	TSR 20	ETSR 19	ETSR 20	RTSR 19	RTSR 20
Beta	–0.04327	0.32049*	–0.0122	0.36604*	0.36828*	0.03424

S o u r c e: Author's own elaboration.

Significant dependencies between beta and TSRs could be expected, according to the potentially positive relationship between the rates of return and risk. However, the results of this part of the study are different. While there was an observable significant correlation between beta and TSR in 2020, in 2019—not, the same was true for ETSR. Based on the theoretical interpretation, it can be concluded that in a group of entities taken into account, the higher risk was not associated with higher rates of return in 2019. Therefore, the third hypothesis could not be absolutely confirmed, but only in reference to 2020, when higher rates of return were achieved by companies with higher beta. What is more, rates of return above the average were achieved by more risky companies, in terms of market fluctuations in share prices, in 2019, while in 2020 there was no significant correlation between these variables. MVA was omitted in this part of the analysis, because it is expressed in absolute terms, while TSRs—in relative values, such as beta.

The following fragment of the analysis is focused on the comparison of accrual indicators and MVA and TSR. For this purpose, correlations between measures based on accrual principle and concept of value creation for shareholders were computed. They are presented in Table 6.

Table 6. Correlations between EPS, ROA, ROE, ROIC and MVA, TSR, ETSR, RTSR

	MVA 18	MVA 19	TSR 19	TSR 20	ETSR 19	ETSR 20	RTSR 19	RTSR 20
EPS 18	–0.00789	0.03307	0.19206	–0.06373	0.19752	–0.06349	–0.06373	0.19206
EPS 19	0.03197	0.07594	0.24728	–0.07559	0.24803	–0.07563	–0.07559	0.24728
ROA 18	0.04589	0.05192	0.25756	0.02807	0.26693	0.02861	0.02807	0.25756
ROA 19	0.05415	0.05964	0.06382	0.00373	0.06523	0.00381	0.00373	0.06382
ROE 18	0.03865	0.04633	0.24108	0.03107	0.25132	0.03167	0.03107	0.24108
ROE 19	0.04082	0.04670	–0.01002	0.03132	–0.00841	0.03144	0.03132	–0.01002
ROIC 18	0.03769	0.04370	0.22223	0.01605	0.23256	0.01664	0.01605	0.22223
ROIC 19	0.05049	0.05719	0.02354	0.02104	0.02714	0.02126	0.02104	0.02354

S o u r c e: Author's own elaboration based on financial data of the analyzed companies.

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[3] *—significant correlation ($p<0.05$).

It is worth underlining that in the case of comparing ROA, ROE, ROIC, EPS and TSRs, there is an existing time shift. Accrual indicators were computed on the basis of financial data from 30 December, and these results influence company's performance in the next year, too (for instance financial statements for the previous year are published in the first or the second quarter of the following year and at the time of publication it influences current stock prices). Therefore, the comparison for example ROA 18 with TSR 19 seems to be a sensible procedure.

Despite the expected dependencies, there are no significant correlations ($p<0.05$) between ROA, ROE, ROIC, EPS and TSR, MVA. It is a quite surprising result, which means that return on assets, equity or invested capital has no similar influence, among an analyzed group of companies, on MVA and TSR neither in the same year, nor in the following one; the same is true for EPS and MVA and TSR. It indicates that measures of value added are not consistent with accrual indicators—both groups are providing different information about the company's performance, therefore the fourth hypothesis might be considered as a rejected one. Hence, it may be useful to use not only ROA, ROE or EPS, but also measures like MVA and TSR, especially its modifications (ETSR, RTSR) during the assessment of the company's profitability in different approaches.

5. Conclusion

Taking everything into consideration, it can be said that IT and video games industry companies are characterized by high volatility of rates of return, according to TSRs. Moreover, a higher risk is only partially associated with higher returns (that is true for 2019 and not for 2020). Further, the level of risk, measured by the beta coefficient, was higher for entities from the gaming industry than for IT companies. What is more, significant correlations between accrual indexes and value added measures were not observable. The obtained results indicate that the economic theories (for example regarding the positive dependence between risk and rates of return and the positive relationship between value added and accrual measures) are only partially confirmed in the actual situation on the IT and video games markets. Generally, the results of previously pointed out studies are significantly different from this one, based on IT and video game companies. It may be caused especially by the selection of the analyzed group of entities, whose area of operating activity is significantly different from classical companies. That difference may be an incentive for further, in-depth research in this area.

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Rynkowa wartość dodana (MVA) i całkowity zwrot dla akcjonariuszy (TSR) wśród firm z branży IT i gier wideo notowanych na Giełdzie Papierów Wartościowych w Warszawie

Abstrakt: Współcześnie pomiar wyników przedsiębiorstwa wydaje się złożony. Jest wiele klasycznych, memoriałowych wskaźników rentowności, takich jak ROA, ROE i EPS. Jednakże koncepcja skupienia się na maksymalizacji wartości dla właścicieli ma wpływ na główny cel funkcjonowania podmiotów gospodarczych. Z tego powodu, a także z uwagi na wady wcześniej wymienionych indeksów, stworzono nowe, odwołujące się do wartości dodanej dla akcjonariuszy.

Wskaźniki takie jak EVA, MVA czy TSR pozwalają na oszacowanie wartości kreowanej przez firmę. Celem artykułu jest analiza wartości dodanej kreowanej przez wybrane spółki giełdowe. Badanie empiryczne skupione była na porównaniu wartości dodanej dla akcjonariuszy z ryzykiem i ze wskaźnikami memoriałowymi, przy użyciu statystyk opisowych, korelacji i regresji. Poziom ryzyka wśród analizowanych przedsiębiorstw (z branży IT i gier wideo, notowanych na Giełdzie Pa-

pierów Wartościowych w Warszawie) różnił się – był dość wysoki dla jednostek, których działalność związana jest z branżą gier wideo, niższy zaś dla przedsiębiorstw z branży IT. Ogólnie wartości MVA i TSR cechowały się dużą zmiennością. Co więcej, wyższe ryzyko nie było związane z wyższymi stopami zwrotu (mierzonymi TSR). Ponadto nie wykazano istotnej zależności pomiędzy wskaźnikami memoriałowymi a miernikami wartości dodanej. Warto wspomnieć, że wynik analizy różni się od rezultatów prac wymienionych w artykule. Może być to spowodowane specyficznym doborem próby badawczej.

Słowa kluczowe: wskaźniki efektywności, stopy zwrotu, wskaźniki memoriałowe, korelacja, rentowność