

# Profitability on an accrual and cash basis on the example of enterprises from video game sector listed on the Warsaw Stock Exchange

**Bartłomiej Pilch**

Cracow University  
of Economics, Poland

E-mail: bpilch98@gmail.com  
ORCID: 0000-0002-0081-4050

---

**Abstract:** The aim of this paper is to check whether information based on accrual basis are reflected in cash approach to profitability. Therefore, whether financial data from income statement are consistent with cash flow statement. The main hypothesis assumes that it is true. To check this ascertainment empirically, financial statements of 8 companies from video game sector listed on Warsaw Stock Exchange (WSE) were examined. First part includes sample definitions of profitability and accrual and cash approach to processes occurring in the enterprise. Applied analytical methods are presented further. In next part empirical dependencies between profitability in accrual and cash approach were analyzed. Research methods included literature review, empirical data analysis and also induction and deduction methods used for inference. Analyzed measurements and indicators were characterized by occurrence of similar signs, descriptive statistics' values and correlations. Therefore, conclusions about consistency between information referred to profitability in not only accrual, but also cash approach have been drawn. Both approaches simultaneously indicate good financial condition referred to profitability among majority of analyzed entities. Considering that, the hypothesis was confirmed.

**Keywords:** net income, operating cash flows, rates of return, financial indicators, generating profits

---

## 1. Introduction

Making profits used to be known as the most important aim of enterprises' activity. On the other hand, nowadays there is another view on the main purpose of functioning of business entities—maximizing their market value (other goals are e.g. maximizing cash flows or market share [Damodaran, 2015]). This inconsistency shows that there is not existing any universal purpose of leading business activity. Therefore, profitability is widely recognized as one of the aims, which are strongly connected with successfully running a business.

Financed by:  
Małopolska School of Economics  
in Tarnów with support  
of the Ministry of Science  
and Higher Education  
("Support for scientific journals")

Correspondence to:  
Bartłomiej Pilch  
bpilch98@gmail.com

Classic approach to profitability is connected with accrual principle. However, recently there has been popular different way which includes cash rule. Especially, increasingly used is approach based on comparing accrual and cash profitability. This way allows to get broader view on business entity's economic situation in terms of gaining profits.

The aim of this paper is verification whether incomes based on accrual principle and cash flows lead to similar conclusions about companies' profitability. The main hypothesis agrees with this statement. Analysis was based on financial data of companies listed on Warsaw Stock Exchange (WSE) in video game sector. Period included in the study is from 2017 to 2019. Applied research methods are literature review, empirical data analysis, induction and deduction methods. First part of the paper is focused on profitability as a measure as well as on accrual and cash principles. In the second section applied methods of analysis, like descriptive statistics and correlation analysis, are shown. Last part embraces empirical analysis based on financial statements of examined companies.

## 2. Accrual and cash profitability

Profitability is defined differently in Polish literature. For instance, this measurement is identified as:

- “occurrence of revenues earning from economic activity exceeding costs of their leading” (Waśniewski, 1997, p. 174);
- “relative measure of financial result indicating management efficiency” (Micherda [ed.], 2004, p. 229);
- “reflection, in the most synthetic form, of efficiency business management” (Sierpińska and Jachna, 2004, p. 95).<sup>1</sup>

Most definitions, like these proposed by B. Micherda and M. Sierpińska with T. Jachna, recognize profitability as a relative measurement, referred to involved capital or expenditures. That approach is compatible with etymology of analyzed word (Stępień, 2013). Therefore, it can be said that profitability indicators reflect relation of income to capital or other reference value.

As mentioned, there are existing two main approaches to measure profitability. First of them, accrual rule, is one of overarching accounting principles. It is regulated by art. 6, par. 1 of The Accounting Act. According to the act, all revenues and associated costs concerning to the fiscal year should be included in accounting books regardless of the date of their payment. Another approach is cash-based. Revenues and costs of the current period are included within it in books at the time of their payment. Previously indicated principles are not always consistent, they might deliver various information about company.

Sources of financial information on accrual and cash basis are different. Income statement provides information about accrual profitability, whereas source of data referred to cash rates of return is cash flow statement. According to Polish law, first of already listed components of financial statement is mandatory for all business entities keeping books of accounts, while cash flow statement is not. That element has to be made only in companies whose financial statement is subject to examination by the auditors. On the other hand, for instance in

---

<sup>1</sup> For more see e.g. Stępień, 2013.

the United States of America, dominates approach mainly using cash values. Generally, in Anglo-Saxon countries, like the USA and Great Britain, the cash rule plays the greater role, while in continental Europe accrual principle is commonly used (Andrzejewski and Mazur-Maślanka, 2017).

Referring to profitability, accrual and cash approach manifests itself by using not only information from income statement, but also from cash flow statement. There are many arguments for that way. For example, evaluation of company's financial condition with using rates based on net income or operating cash flows is quite easy, and because of it that solution is widely used. Furthermore, based on comparison of accrual financial result and cash flows it is possible to find out, how much of the generated profit found reflection in actual cash flows (Sierpińska and Jachna, 2004). Moreover, cash better reflects the entity's payment capacity, when accrual income is vulnerable to manipulations (Misztal, 2018). What is more, amortization and depreciation, elements of accrual financial result, are important for many companies and they are not cash expenditures. Thereby, these quantities are reasons of dissimilarity between accrual and cash financial result (Friedlob and Scheifer, 2003). Because of many weaknesses of accrual approach to profitability (presented also e.g. by: Maślanka, 2008; Mazloom, Azarberahman and Azarberahman, 2013), it may seem that cash approach is a better one. However, it is not essential to use only cash flow data. Sometimes analyzing only cash flows may lead to conclusion about good financial situation of company, while in reality it is not true (Friedlob and Scheifer, 2003). Taking everything into account, it could be said that it is intentional to consider both accrual financial results and cash flows. This opinion is shared by the researchers of the subject (e.g. Watson and Wells, 2005; Scott, 2007).

Comparison of cash and accrual profitability usually involves net income and operating cash flows. When these two quantities are characterized by similar size, it could be stated that accrual profitability is reflected in cash flows from basic company activity. In other situations (when operating cash flows are above 0 and the net loss is generated, or vice versa) income and cash flow statements are providing inconsistent information about company's ability to generate profit (Maślanka, 2008).

### 3. Applied methods of analysis

Subject of analysis are financial statements from years 2017–2019 of companies listed on Warsaw Stock Exchange (WSE) Main Market in video game sector. 8 companies were selected out of 10, because of availability of their financial statements for 2019. Companies included in the analysis are: PlayWay S.A. (further: PlayWay), CD Projekt S.A. (CD Projekt), Ultimate Games S.A. (Ultimate Games), Ten Square Games S.A. (Ten Square Games), 11 Bit Studios S.A. (11 Bit Studios), Artifex Mundi S.A. (Artifex Mundi), CI Games S.A. (CI Games) and BoomBit S.A. (BoomBit).

Initially, variants of operating, investing and financing cash flows were analyzed among group of examined companies. Subsequently, relations between net income and operating cash flows were checked. Further part of analysis was focused on accrual and cash indicators of profitability. Construction of these indexes is as follows (Damodaran, 2015; Mazur-Maślanka 2017):

- *return on equity (ROE)* =  $\frac{\text{net income}}{\text{average value of equity}}$ ,
- *return on assets (ROA)* =  $\frac{\text{net income}}{\text{average value of assets}}$ ,
- *return on sales (ROS)* =  $\frac{(\text{net income})}{\text{revenues from sales}}$ ,
- *return on invested capital (ROIC)* =  $\frac{\text{operating income} \times (1 - \text{tax rate})}{\text{invested capital}}$ ,
- *cash return on equity (cash ROE)* =  $\frac{\text{operating cash flows}}{\text{average value of equity}}$ ,
- *cash return on assets (cash ROA)* =  $\frac{\text{operating cash flows}}{\text{average value of assets}}$ ,
- *cash return on sales (cash ROS)* =  $\frac{\text{operating cash flows}}{\text{revenues from sales}}$ .

Firstly, descriptive statistics based on these indicators were computed—arithmetic average, standard deviation, coefficient of variation, quartiles, minimum and maximum values and distance (Wasilewska, 2009). After that, correlations between analyzed indicators were calculated.

#### 4. Empirical analysis of accrual and cash profitability

Focus was especially on cash flow analysis despite its quite rare using, to emphasize its value for recipients. Therefore, variants of cash flows were analyzed, because of signs of operating, investing and financing flows. Next, connections between the net income and operating net cash flows were studied. Further part is analysis of descriptive statistics of indicators based on accrual and cash principles. At the end, correlations existing between those indexes were computed.

In group of companies listed on WSE dominated versions with plus operating cash flows. Table 1 shows variants of cash flows observed among these companies in the period 2017–2019.

Table 1. Observed variants of cash flows

| Variant of cash flows* | Numbers of observed cases |      |      |              |
|------------------------|---------------------------|------|------|--------------|
|                        | 2017                      | 2018 | 2019 | Together (%) |
| +,+,+                  | 0                         | 0    | 1    | 4.17         |
| +,+,-                  | 0                         | 1    | 1    | 8.33         |
| +, -, +                | 1                         | 2    | 2    | 20.83        |
| +, -, -                | 5                         | 4    | 3    | 50.00        |
| - , -, +               | 0                         | 1    | 0    | 4.17         |
| - , +, -               | 0                         | 0    | 1    | 4.17         |
| - , +, +               | 1                         | 0    | 0    | 4.17         |
| - , -, -               | 1                         | 0    | 0    | 4.17         |

\* In sequence: signs of operating, investing, financing activities.

Half of companies are characterized by appearance of variant with higher than 0 operating and negative investing and financing cash flows. Analyzed version is commonly approved as evidence of solid economy condition, when net operating flows allow to invest and pay liabilities. It may be interpreted as positive information about companies' financial condition, in terms of profitability. The best companies in this approach are CD Projekt and Ten Square Games, which achieved variant taken into account in years 2017–2019.

Quite popular among analyzed entities was variant with positive operating and financing cash flows. It indicates good companies' statuses as well as the previous one. Corporations reaching this option of cash flows are taking advantages from their basic activity and acquiring other sources of funding, so it can be supposed that they highly likely have trust of creditors. Such flows appeared e.g. in 11 Bit Studios (2017–2018) and CI Games (2018–2019).

In two cases, Ultimate Games in 2018 and PlayWay in 2019, there were observed negative financing cash flows with positive other. This is average information about financial situation of these companies. Moreover, remaining versions of signs of cash flows were observed once at analyzed period. Worth focusing is condition of Artifex Mundi, where were observed variants with operating cash flows lower than 0 in every year 2017–2019. Such situation indicates problems with basic activity in this entity. It should be assessed as a negative symptom of condition of this company.

Connections between net income and operating cash flows were further examined. Relations among these variables are shown in Table 2.

Table 2. Relations between net income and operating cash flows

| Net income | Operating cash flows | Number of observed cases |      |      |              |
|------------|----------------------|--------------------------|------|------|--------------|
|            |                      | 2017                     | 2018 | 2019 | Together (%) |
| +          | +                    | 6                        | 6    | 6    | 75.00        |
| +          | –                    | 1                        | 0    | 0    | 4.17         |
| –          | +                    | 0                        | 1    | 1    | 8.33         |
| –          | –                    | 1                        | 1    | 1    | 12.50        |

“+” means value > 0, “–” value < 0 (no values = 0).

S o u r c e: Author's own elaboration based on financial statements of analyzed enterprises.

Most observations were characterized by appearance of positive variants not only of the net income, but also of operating cash flows (half of analyzed companies, PlayWay, CD Projekt, 11 Bit Studios and Ten Square Games, throughout the entire analysis period). This variant must be evaluated as good signal referred to financial condition of these entities. Another situation was observed in Artifex Mundi. This company noted less than 0 both net income and operating cash flows. It signals considerable problems with profitability of this company in terms of accrual and cash principles. Other variants have been observed once at some companies (net loss and positive operating flows in Ultimate Games in 2017, negative financial result and operating cash flows in CI Games in 2018 and BoomBit in 2019). In these cases

only three forms of profitability did not give similar information. Summarizing, in majority of cases the inferences relating to accrual and cash profitability are consistent. Sign of the accrual income finds confirmation in operating cash flows in 87.5% cases.

Next part of analysis was focused on financial indicators. Firstly, descriptive statistics for these indexes were computed. It has been shown in Table 3.

Table 3. Descriptive statistics among analyzed indexes

| Indicator | Av.   | D    | V      | Q1   | Med.  | Q3     | Min.    | Max.   | Dist.  |
|-----------|-------|------|--------|------|-------|--------|---------|--------|--------|
| ROE       | 31.6% | 0.47 | 149.5% | 4.3% | 24.1% | 68.4%  | -51.7%  | 143.1% | 194.8% |
| ROA       | 26.9% | 0.39 | 145.4% | 3.1% | 22.7% | 60.7%  | -42.7%  | 110.7% | 153.4% |
| ROS       | 18.8% | 0.46 | 244.2% | 4.9% | 32.2% | 47.6%  | -102.4% | 89.9%  | 192.3% |
| ROIC      | 76.9% | 1.26 | 161.5% | 8.8% | 27.4% | 111.2% | -46.3%  | 448.0% | 494.3% |
| C. ROE    | 31.0% | 0.43 | 138.0% | 7.7% | 25.8% | 54.7%  | -41.7%  | 162.5% | 204.2% |
| C. ROA    | 25.4% | 0.34 | 134.8% | 5.4% | 24.7% | 45.9%  | -36.8%  | 125.8% | 162.5% |
| C. ROS    | 27.3% | 0.32 | 116.2% | 9.5% | 38.3% | 47.7%  | -33.7%  | 71.3%  | 105.0% |

Av.—arithmetic average, D—standard deviation, V—coefficient of variation, Q—quartile, Min., Max.—in sequence: minimum and maximum value, Med.—median, Dist.—distance (between Min. and Max.); C. ROE, C. ROA, C. ROS—in sequence: cash return on equity, assets and sales.

S o u r c e: Author's own elaboration based on financial statements of analyzed enterprises.

ROE indicators in accrual and cash approach are characterized by appearance of similar values of descriptive statistics, especially arithmetic average and standard deviation. Such situation was observable in case of ROA, too. Noticeable values were quite high, close to 25% and 30% average in sequence for return on equity and assets. Otherwise, these indexes were characterized by high variability—values of coefficients of variation exceeded 100%. Significant differentiation of values of ROA and ROE indicators are confirmed by minimum, maximum and distance values (at the level of several times higher than arithmetic average).

Return on sales in accrual approach reached values below 20% on average, whereas volatility of this index was quite high. This index is the only one, which the absolute value of minimum was higher than maximum. Cash ROS reached higher values than its accrual equivalent, for instance for average and quartiles, whereas its variability was at the lower level. Therefore, it can be stated that in the case of sales profitability cash index took more favourable values than its accrual version.

Finally, descriptive statistics for indicators of profitability of equity in accrual and cash variants were characterized by similar values. It allows to suppose that there are existing positive dependencies between them, similarly as in the case of ROA. However, for return on sales calculated measurements were slightly different in accrual and cash approach.

To check if there are existing statistically relevant dependencies among analyzed indexes, correlations between these indicators were calculated. Results of this study are shown in Table 4.

Table 4. Correlations between accrual and cash indicators

|        | ROE     | ROA     | ROS     | ROIC    | C. ROE  | C. ROA  | C. ROS |
|--------|---------|---------|---------|---------|---------|---------|--------|
| ROE    | 1.000   | –       | –       | –       | –       | –       | –      |
| ROA    | 0.996** | 1.000   | –       | –       | –       | –       | –      |
| ROS    | 0.666** | 0.697** | 1.000   | –       | –       | –       | –      |
| ROIC   | 0.911** | 0.885** | 0.416*  | 1.000   | –       | –       | –      |
| C. ROE | 0.787** | 0.750** | 0.386   | 0.787** | 1.000   | –       | –      |
| C. ROA | 0.795** | 0.764** | 0.421*  | 0.774** | 0.997** | 1.000   | –      |
| C. ROS | 0.313   | 0.320   | 0.573** | 0.124   | 0.539** | 0.570** | 1.000  |

C. ROE, ROA, ROS—in sequence: cash return on equity, assets, sales.

\*—relevant with  $p < 0.05$ ; \*\*—relevant with  $p < 0.01$ .

S o u r c e: Author's own elaboration based on financial statements of analyzed enterprises.

There are observed very strong connections between accrual return on equity and assets and between their cash equivalents. However, for aims of this paper it is essential to measure correlations between cash and accrual forms of the same indicators. For ROE there was noticeable strong, positive dependence between two types of this index, almost at the level of 0.78. Similarly it is for ROA, where value of correlation is bigger than 0.75, too. A little difference existed between accrual and cash ROS. Dependence of this indicators is less than 0.6, however it is still statistically relevant positive correlation. To sum up, it could be said that there are observed strong, positive dependencies between accrual and cash indicators on average.

## 5. Conclusion

The research, focused on dependencies between accrual and cash indicators referred to profitability, allows conclusions to be drawn. Accrual and cash variants of rates of return were characterized by occurrence of similar values of descriptive statistics (especially average and standard deviation). For ROE and ROS differences between cash and accrual measures were at the lower level than for ROA. Furthermore, among analyzed indicators there were observable positive dependencies on average. Accrual and cash versions of return on equity were characterized by strong correlations. The same was true for return on assets. For return on sales dependency was weaker, it could to be evaluated as moderate correlation.

In general, accrual and cash indicators referred to profitability in group of 8 companies listed on WSE in video game sector on average led to similar conclusions about companies' financial condition. Likewise, the net income and operating cash flows in most cases (87.5%) were source of congenial information. It can be stated that on an example of that business entities accrual incomes were confirmed in cash flows in period from 2017 to 2019. Therefore, the hypothesis might be considered as a confirmed one.

## References

- Andrzejewski, M., Mazur-Maślanka, I. (2017). Memoriałowe a kasowe stopy zwrotu na podstawie przedsiębiorstw przemysłu spożywczego notowanych na GPW w Warszawie. *Studia Ekonomiczne*, 345, 7–20.
- Damodaran, A. (2015). *Applied corporate finance*. Hoboken: John Wiley & Sons. ISBN 9781118808931.
- Friedlob, G. T., Schleifer, L. L. (2003). *Essentials of financial analysis*. Hoboken: John Wiley & Sons. ISBN 0471228303.
- Maślanka, T. (2008). *Przepływy pieniężne w zarządzaniu finansami przedsiębiorstw*. Warszawa: C. H. Beck. ISBN 9788325502393.
- Mazloom, A., Azarberahman, A., Azarberahman, J. (2013). The association between various earnings and cash flow measures of firm performance and stock returns: Some Iranian evidence. *International Journal of Accounting and Financial Reporting*, 3(1), 24–41. DOI: 10.5296/ijaf.v3i1.2994.
- Micherda, B. (ed.). (2004). *Współczesna analiza finansowa*. Kraków: Zakamycze. ISBN 8373333428.
- Miształ, A. (2018). Kasowy i memoriałowy wymiar oceny rentowności przedsiębiorstw. *Przedsiębiorczość i Zarządzanie*, 19(11), 213–224.
- Scott, S. (2007). The importance of cash flow analysis for small businesses. *Commercial Lending Review*, 2, 37–48.
- Sierpińska, M., Jachna, T. (2004). *Ocena przedsiębiorstwa według standardów światowych*. Warszawa: Wydawnictwo Naukowe PWN. ISBN 8301142065.
- Stępień, K. (2013). Definityjne i metodyczne problemy rentowności. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 920, 101–110.
- Wasilewska, E. (2009). *Statystyka opisowa od podstaw. Podręcznik z zadaniami*. Warszawa: Wydawnictwo SGGW. ISBN 9788375831726.
- Waśniewski, T. (1997). *Analiza finansowa w przedsiębiorstwie*. Warszawa: Fundacja Rozwoju Rachunkowości w Polsce. ISBN 8386543876.
- Watson, J., Wells, P. (2005). *The association between various earnings and cash flow measures of firm performance and stock returns: Some Australian evidence* [online, accessed: 2020-06-14]. Retrieved from: <http://ssrn.com/abstract=815365>. DOI: 10.2139/ssrn.815365.

## Rentowność w ujęciu memoriałowym i kasowym na przykładzie przedsiębiorstw z branży gier wideo notowanych na Giełdzie Papierów Wartościowych w Warszawie

**Abstrakt:** Celem opracowania jest sprawdzenie, czy informacje oparte na zasadzie memoriałowej znajdują odzwierciedlenie w kasowym podejściu do rentowności. Równocześnie, czy dane finansowe z rachunku wyników są zgodne z ujętymi w sprawozdaniu z przepływów pieniężnych. Główna hipoteza zakłada prawdziwość takiego stwierdzenia. W celu empirycznej weryfikacji tego założenia badaniu poddano sprawozdania finansowe 8 przedsiębiorstw z branży gier wideo notowanych na Głównym Rynku Giełdy Papierów Wartościowych w Warszawie. W pierwszej części artykułu zaznaczono przykładowe definicje rentowności oraz memoriałowe i kasowe podejście do procesów zachodzących w przedsiębiorstwie. Dalej przed-

stawiono wykorzystane metody analityczne. W ramach kolejnego fragmentu przeanalizowano empiryczne zależności pomiędzy zyskownością w ujęciu memoriałowym i kasowym. Metodyka badań obejmowała przegląd literatury, empiryczną analizę danych, metody indukcji i dedukcji wykorzystane do wnioskowania. Analizowane miary i wskaźniki charakteryzowały się podobnymi znakami, wartościami statystyk opisowych i korelacjami. Wobec tego wyciągnięto wnioski o zgodności informacji odnoszących się do rentowności zarówno w ujęciu memoriałowym, jak i kasowym. Oba ujęcia równocześnie wskazywały na dobrą kondycję pod względem zyskowności wśród większości badanych podmiotów. Wobec tego hipoteza została potwierdzona.

**Słowa kluczowe:** zysk netto, operacyjne przepływy pieniężne, stopy zwrotu, wskaźniki finansowe, generowanie zysków